2012 Agricultural Water Management Plan

2015 Update

Update Prepared Pursuant to Water Code Section 10826
and Executive Order B-29-15

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Acronyms and Abbreviations

AF	acre-feet
Aqueduct	Governor Edmund G. Brown California Aqueduct
AWMP	Agricultural Water Management Plan
Board	Board of Directors
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CVP	Central Valley Project
CWD	Cawelo Water District
District	Dudley Ridge Water District
DWR	California Department of Water Resources
EWMP	Efficient Water Management Practice
KWB	Kern Water Bank
KWBA	Kern Water Bank Authority
mg/L	milligrams per liter
NTU	Nephelometric Turbidity Unit
Plan	Agricultural Water Management Plan
Project	State Water Project
SGVMWD	San Gabriel Valley Municipal Water District
SWC	State Water Contractors
SWP	State Water Project
SWSD	Semitropic Water Storage District
TWUE	Total Water Use Efficiency
Westside Districts (or WS5)	Belridge Water Storage District, Berrenda Mesa Water District, Dudley Ridge Water District, Lost Hills Water District, and Wheeler Ridge–Maricopa Water Storage District

Section I: Introduction

A. Description of Previous Water Management Activities

This Agricultural Water Management Plan ("AWMP" or "Plan") represents the first update to the 2012 Plan prepared by Dudley Ridge Water District ("District") to comply with the requirements of the SB X7-7 (the Water Conservation Act of 2009). The District has, however, been involved in other water management efforts, as itemized below.

Five previous water management plans have been prepared for or by the District.

In 1983, the Department of Water Resources ("DWR") prepared a report for the District titled "Final Draft-Recommended Water Management Plan for Dudley Ridge Water District, A Service Area of the State Water Project". The 1983 report was one of several prepared to assist State and local agencies in the efficient use of existing water supplies. The 1983 report recommended the following:

1. Continue grower practices to reduce evapotranspiration, including the installation of low-volume irrigation for young trees and vines.
2. Continue landowner-initiated programs to improve irrigation management, including a) construction of additional tailwater return systems, b) support of a soil laboratory to determine improved water application methods, c) support of an experimental station to conduct field tests on irrigation systems and methods, and d) support of an irrigation scheduling program.
3. Encourage continuation of irrigation scheduling programs already practiced in the District and expand this practice to the remainder of the District.
4. Evaluate seepage losses from unlined on-farm distribution systems to determine the const-effectiveness of corrective measures.

In 1987, the District updated and expanded the previous plan as an effort to improve water management practices and provide a basis for developing water conservation projects, recognizing the decreasing ability for the State Water Project ("SWP" or "Project") to meet project demands. The 1987 plan was titled "Water Management Plan for Dudley Ridge Water District". The 1987 report recommended the following:

1. Landowner installation of low-volume irrigation systems on new permanent crop plantings.
2. Continue on-farm weed control measures.
3. Distribute information to water users regarding irrigation scheduling and system evaluations.
4. Continue existing on-farm irrigation scheduling programs and expand awareness of programs to others.
5. Inform water users of educational and training seminars related to irrigation management.
6. Encourage on-farm metering of irrigation deliveries and tailwater return flows.
7. Continue grower practice of performing irrigation evaluations and applying the information to similar field conditions.

8. Review programs and results from other agricultural water suppliers and assess their applicability for the District.
9. Continue on-farm programs to improve irrigation management, including participation in seminars, installation of on-farm flowmeters, participation in University of California's Cooperative Extension research projects and installation of automatic controls and more efficient irrigation systems.
10. Implement water conservation projects that are cost-effective and financially feasible.

In 1992, the District prepared and adopted the "Dudley Ridge Water District 1992 Water Management Plan" in fulfillment of the requirements of AB 1658 (the Agricultural Water Management Planning Act of 1986). The 1992 report recommended the following:

1. Develop a firm District water supply sufficient to meet the needs of permanent and other high value crops in all years through long-term water transfers, exchanges, and/or groundwater banking programs with other agencies.
2. Alleviate water charges to landowners in years when they do not receive a water supply.
3. Minimize short-term financial hardships to landowners due to SWP delivery deficiencies that may be imposed prior to developing goals 1 and 2.
4. Implement identified water management opportunities that are cost-effective and financially feasible for water users and landowners.

In 2005, the District prepared and submitted the "2005 Agricultural Water Management Plan" in compliance with AB 3616 (the Agricultural Water Suppliers Efficient Water Management Practices Act of 1990), in accordance with the January 1, 1999 Memorandum of Understanding Regarding Efficient Water Management Practices by Agricultural Water Suppliers in California. The 2005 report concluded that the District had fully implemented all of the critical Efficient Water Management Practices ("EWMP") and the applicable conditional EWMPs.

In 2012, the District prepared and submitted the "2012 Agricultural Water Management Plan" in compliance with SB X7-7. The 2012 report concluded that the District had fully implemented all of the critical and the applicable conditional EWMPs.

The purposes for preparing the 2015 update to the 2012 Plan for the District are to:

1. Incorporate the requirements from the Governor's April 1, 2015 Executive Order (B-29-15) to include in the AWMP a detailed drought management plan in addition to quantification of water supplies and demands for the 2013, 2014, and 2015 years to the extent data is available.
2. Continue to evaluate the District's water management practices.
3. Identify areas to improve the efficiency of water use within the District
4. Consider past and future water management strategies to increase the reliability of water deliveries to the District.
5. Document the District's water management plan to its water users and other

interested parties, including, but not limited to, providing a document for which to conduct a California Environmental Quality Act ("CEQA") review to expedite processing of future water transfers, exchanges, and banking operations.

B. Coordination Activities

1. Notification of AWMP Preparation

Worksheet 1 provides a summary of specific interested parties that are to be notified and/or requested to provide some level of involvement in the 2015 AWMP during the public review process. As the review process progresses, dates will be inserted under the appropriate columns.

Worksheet 1. Summary of Coordination, Adoption, and Submittal Activities

Potential Interested Parties	Notified of Draft AWMP and Public Meeting	Requested Copy of Draft AWMP	Copy of Adopted AWMP Sent
Local Newspaper The Corcoran Journal	12/4/2015		
Local Government Agencies Kings County			1/15/16
Kings County Water Commission	12/4/2015		
Kings County LAFCO	12/4/2015		1/15/16
Other Special Districts Tulare Lake Basin WSD	12/4/2015		
Kern County WA	12/4/2015		
Kettleman City CSD	12/4/2015		
Green Valley WD	12/4/2015		
State Government Agencies Department of Water Resources			1/15/16
Regional Water Quality Control Board			
California State Library			1/15/16
Other District Landowners/Water Users	12/4/2015		

2. Public Participation

Prior to adopting the Plan, the District made the proposed Plan available for public inspection and held a public hearing on the Plan. Prior to the hearing, notice of the time and place of hearing was published in a local newspaper and posted within the District and at the District office. Exhibit 1 includes copies of the public notifications on the hearing time and place, copies of the notice of availability of the Plan for public review, and public comments that were received and considered prior to adoption.

C. Plan Adoption and Submittal

1. Plan Adoption

At the hearing held on January 13, 2016, the Board of Directors (Board) adopted the Plan on a unanimous vote. A copy of the Resolution of Plan Adoption is included in Exhibit 2.

2. Plan Submittal

After adoption, the Plan was submitted to the interested parties as shown in Worksheet 1.

3. Plan Availability

After adoption, an electronic copy of the Plan was sent to DWR to be made available for public review on DWR's internet website.

D. Plan Implementation Schedule

Following adoption, the District intends to subject the Plan to CEQA review to expedite processing of future water transfers, exchanges, and banking operations that are addressed in the Plan. The District intends to update the Plan again in 2020 and subsequently on a five-year schedule.

Section II: Description of the Agricultural Water Supply and Service Area

A. Physical Characteristics

1. History and Size of the Service Area

The District is a California Water District, formed subsequent to a vote of the landowners on September 26, 1962 and organized on January 26, 1963 under California Water District Law, Division 13, Section 34000 et. seq. of the California Water Code. A five-member Board of Directors ("Board") governs the District. Board members must be landowners in the District or a designated representative of a landowner.

Since 1991, as a result of a zero SWP allocation to the District that year, the District has operated without any employees. Prior to that time, the District employed one ditchtender to oversee field operations. Currently, these field duties and other duties to manage and operate the District are performed in part by contracted services (part-time ditchtender and a management consultant) and in part by various farm operators themselves or by private contractors retained by the District (primarily weed control and facility maintenance).

The District's primary water source is imported surface water supplies from the SWP; the District does not use local groundwater due to its low yields and poor quality. In addition to the SWP supplies, water has been made available through programs for water regulation and storage in off-site groundwater basins and from purchases, transfers, and balanced and unbalanced exchanges from other water agencies. The District's surface water supply is comprised of (1) SWP Table A contract amount of 45,350 acre-feet ("AF"), (2) other SWP water including Article 21, Turnback Pool, Multi-Year Water Pool, and occasional annual or multi-year transfers or exchanges with other SWP contractors, and (3) as available, Dry Year Transfer Program water (defined later in this document) and non-Project water obtained outside the District and delivered to the District or to its banking/exchange programs. In drier years, the District's supply is heavily supplemented by banked water recovered from groundwater storage programs in which the District is participating; in average to wet years, the supply is mostly or exclusively from surface water sources.

The land use within the District is agricultural; the District's boundaries do not encompass any incorporated or unincorporated communities. Through a number of annexations over the years, the District has expanded in size from the original 29,330 acres to its current size of 37,615 acres, of which 23,010 acres have a water allocation and approximately 17,000 acres are currently farmed.

2. Location of the Service Area and Water Management Facilities

The District is located in southern Kings County on the western edge of the San Joaquin Valley. The District lies south of Kettleman City and is bounded on the northeast by the Tulare Lake Basin Water Storage District, on the south by the Kings-Kern County Line, and generally on the west by the Governor Edmund G. Brown California Aqueduct

("Aqueduct"). Interstate 5 traverses the District in a northwest-southeast direction. Refer to Exhibit 3 for a location map and Exhibit 4 for a water distribution system map of the District.

The District delivers water from the Aqueduct through five delivery structures ("turnouts"). From each turnout, water is delivered to landowners through District owned concrete-lined canals and/or underground pipelines to metered farm turnouts.

The District owns approximately 12 miles of concrete-lined distribution canals and 10 miles of pipelines. In addition to the distribution canals and pipelines, the District owns a terminal reservoir to capture operational spills, whereby the final field deliveries can be made directly from the reservoir. While this reservoir was historically utilized, privately owned storage reservoirs have since been constructed that supplant its operation. Refer to Worksheet 2 for the itemized water distribution system inventory.

Worksheet 2. Water Conveyance and Delivery System

Supply Points	Year Constructed /Deeded	Headworks Design Capacity (cfs)		Type	
Turnout No. DR1	1967	67		Venturi meter	
Turnout No. DR1-A	1984	36		Venturi meter	
Turnout No. DR1-B	1997	25		Venturi meter	
Turnout No. DR2	1967	193		Parshall flume	
Turnout No. DR3	1967	170		Parshall flume	
Supply Canals	**Year Constructed /Deeded**	**Pipe Diameter (In)**	**Average Bottom Width (ft)**	**Type**	**Length (mi)**
Lateral 1-A	1985	24		Concrete pipe	1.0
Lateral 1-B	1984	24		Concrete pipe	0.9
Canal 2-E	1989		2	Concrete lined	4.5
Canal 2-E1	1992		2	Concrete lined	2.0
Canal 2-S	1967		6	Concrete lined	1.2
Lateral 2-D	1967	42, 48		Concrete pipe	1.0
Canal 3-S	1967		6	Concrete lined	1.2
Canal 3-S Extension	1990		8	Concrete lined	3.2
Lateral 3-E1	1990	12-27		PVC pipe	4.0
Lateral 3-E2	1989	12-27		PVC pipe	3.1
Reservoirs	**Year Constructed /Deeded**	**Acreage**	**Type**		
Reservoir 2-E	1991	10.33	Earth lined		
Reservoir 2-E1	1992	6.06	Earth lined		
Emergency Spill Easements	**Year Constructed /Deeded**	**Acreage**	**Type**		
Canal 2-S	1974	6.06	Earth lined		

Canal 2-E	1989	8.31	Earth lined		
Canal 3-S	1989	86.27	Earth lined		

The District does not own or operate any subsurface drainage facilities. Shallow groundwater conditions experienced prior to the late 1980's have long since been alleviated by extensive landowner conversions to low-volume irrigation systems. The only surface water drainage facilities controlled by the District are pipelines installed to carry local runoff under District canals. Similar drainage pipelines and structures are owned and operated by the State of California to protect the Aqueduct and Interstate 5 from flooding.

Landowners are required by the District to maintain applied water on their lands—privately operated tailwater/spill recovery systems are in place to accomplish this element of water management.

Operational Constraints

Daily operations of the SWP can result in constraints to the efficient operation of the District's delivery system.

- ***Aqueduct water level variability:*** Automated Aqueduct turnouts DR1, DR2 and DR3 have the ability to open or close as water levels in the Aqueduct fluctuate, to maintain consistent downstream deliveries. Turnouts DR1-A and DR1-B are siphons that operate on the difference in elevation (head) between the Aqueduct and the turnout discharge; downstream deliveries are highly dependent on Aqueduct levels.

  As an example, Aqueduct levels at DR1-A can fluctuate between elevations 312.2 feet and 310.5 feet above mean sea level. At the higher level, the maximum flow rate through the turnout is 32 cubic feet per second (cfs); at the lower level the maximum flow rate drops to 17 cfs. To the extent possible, DWR operations personnel respond to District requests to raise Aqueduct levels to minimize delivery constraints due to water level variability.

- ***Moss/weed buildup:*** From late spring through fall the Aqueduct, which functions more like a series of connected reservoirs than a flowing canal, tends to experience a buildup of moss, algae, and aquatic weed growth. These weeds can lead to blockages at the intakes of the turnouts and reductions in delivery capacity throughout the distribution system.

  To combat this problem, the District installed traveling water screens at turnouts DR2 and along Canal 3-S from turnout DR3. These screens mechanically remove moss and weeds prior to the intakes to the turnouts. The District's other turnouts utilize stationary grates (DR1) and downstream intake pipe orientations (DR1-A and DR1-B) to minimize weed uptake, but this has proven inadequate due to the amount of seasonal moss and weeds in the Aqueduct.

Additionally, the District must also use herbicide applications to supplement its weed control strategies. Beginning as early as May and continuing through October, the District contracts with local chemical companies for regular applications of herbicides to control weed growth. In practice, the District must spend tens of thousands of dollars annually on weed control and water users regularly must manually or mechanically remove debris to prevent damage and capacity constraints to their irrigation systems.

- ***Aqueduct capacity/peaking constraints:*** When Aqueduct capacity becomes oversubscribed by other SWP contractors, agricultural contractors can be limited by contract (under Article 12b of the Water Supply Contract) to delivering a maximum of 18% of their annual Table A contract amount in any given month—this equates to a maximum delivery to the District of 8,163 AF (~137 cfs) in any given month, and it is anticipated that this constraint could cause delivery shortfalls in the future. In 2003 the District was awarded a Proposition 204 (the Safe, Clean, Reliable, Water Supply Act) grant to evaluate the development of off-stream surface reservoirs to, among other purposes, store water to be made available for delivery during the peak months—none of the sites evaluated proved to be cost-effective.

3. Terrain and Soils

A small portion of the District is located on the shore of the historic Tulare Lake, however, most of the District is on smooth, gently sloping alluvial fans extending eastward from the Kettleman Hills. Elevations range from about 190 to 350 feet above sea level. The slope varies from 15 feet per mile in the southeast part of the District to slightly more than 60 feet per mile in the northwest. Over shorter distances, near the apex of some more recent alluvial fans, there are slopes of about 4 percent and the break from the fans to the lakebed is very steep. However, most of the District has slopes of less than 25 feet per mile.

There are no major streams in the District. Minor streams (drainage arroyos) in the Kettleman Hills to the west will on rare storm occasions produce sufficient runoff to reach the District. Damage to land and crop losses due to flooding have occurred during these rare runoff events.

The predominant soil type for the northern portion of the District (the lower half of township 22 to the upper quarter of township 23) is Wasco-Westhaven-Westcamp. The predominant soil type in the mid portion of the District (the rest of township 23 to the upper quarter of township 24) is Wasco-Panoche-Westhaven. The remainder of the District is both Lethent-Garces-Panoche with Milham bordering the west and Kimberlina-Twisselman the south. The soils are rated by grades from 1 to 6 with 1 being a soil with no limiting factors (i.e. drainage problems, high salinity, etc.) and 6 having the highest limitations for farming.

Worksheet 3 lists the names and generalized descriptions for soils found in the District. As shown in the table, over 70% of the District is comprised of soils that are Grade 2 or better; the remainder of the soils are generally poorer drained or more severely sloped, and are generally not farmed.

Worksheet 3. Landscape Characteristics

Map Symbol/Soil Name[1]	% of District	Percolation Rate (inch/hour)	Grade	Soil Description
102 Avenal loam, 0-5% slopes	< 1	0.2-2.0	1	Very deep, well drained
105 Cantua coarse sandy loam, 5-15% slopes	< 1	2.0-6.0	2	Deep, somewhat excessively drained
109 Delgado sandy loam, 5-15% slopes	< 1	2.0-6.0	4	Shallow, somewhat excessively drained
112 Excelsior sandy loam	< 1	0.06-2.0	3	Very deep, well drained
113 Garces loam	11	<0.06-0.6	4	Very deep, well drained
124 Homeland fine sandy loam, partially drained	< 1	0.6-6.0	5	Very deep, poorly drained
125 Houser fine sandy loam, drained 126 Houser clay, partially drained	1 < 1	<0.06-6.0 <0.06	4 5	Very deep, somewhat poorly drained
127 Kettleman loam, 5-15% slopes	< 1	0.6-2.0	2	Moderately deep, well drained
131 Kimberlina fine sandy loam, sandy substratum	3	2.0-6.0	1	Very deep, well drained
139 Lethent clay loam	3	<0.06-0.2	3	Very deep, moderately well drained
144 Milham sandy loam, silty substratum	12	0.06-6.0	2	Very deep, well drained
150 Panoche loam 151 Panoche clay loam, saline-alkali	20 9	0.6-2.0 0.2-0.6	1 2	Very deep, well drained
154 Pits and Dumps	< 1		6	
155 Rambla loamy sand, drained	7	<0.06-6.0	3	Very deep
162 Sandridge loamy fine sand	2	0.6-2.0	2	Very deep, somewhat excessively drained
165 Twisselman silty clay 166 Twisselman silty clay, saline-alkali	2 < 1	0.06-0.2 <0.06	3 4	Very deep, well drained
174 Wasco sandy loam, 0-5% slopes	11	2.0-6.0	1	Very deep, well drained
175 Westcamp loam, partially drained	3	<0.06-2.0	3	Very deep, somewhat poorly drained
176 Westhaven loam, 0-2% slopes 177 Westhaven loam, 2-5% slopes 178 Westhaven clay loam, saline-alkali, 0-2% slopes	5 3 3	0.2-6.0 0.2-6.0 0.06-0.2	1 1 2	Very deep, well drained

[1] Soil Survey of Kings County, California, USDA Soil Conservation Service (now NRCS) 1986.

Exhibit 5 provides a soils map of the District.

The topography and location of the District favors early fruit production and generally long growing seasons. These factors have little effect on the operations and management of the District.

4. Climate

The District's regional climate is semi-arid with hot, dry summers and mild winters. Average daily temperatures vary from 45 degrees in January to 84 degrees in July, with typical diurnal ranges of 32 degrees in the summer to 20 degrees in the winter. Annual precipitation from 1955 through 2015 averaged 6.64 inches, with over 90 percent of the total rainfall received between October and April. Refer to Worksheet 4 for District climatology for selected periods.

Worksheet 4. Detailed Climate Characteristics

Month	Average Precipitation, Inches[1]	Average Reference Evapotranspiration (ETo), Inches[2]	Average Minimum Temperature, °F	Average Maximum Temperature, °F
January	1.38	1.39	35.2	55.2
February	1.18	2.23	39.7	62.1
March	0.82	4.16	42.9	68.1
April	0.69	6.04	47.2	74.3
May	0.31	7.99	54.5	84.4
June	0.06	8.58	61.7	93.0
July	0.01	8.88	68.0	100.1
August	0.03	8.28	66.5	98.6
September	0.09	6.28	60.7	92.1
October	0.27	4.39	52.0	80.6
November	0.72	2.25	41.8	67.1
December	1.08	1.34	35.7	56.1
Annual	**6.64 Total 2.63 (1972)– 13.16 (2010)**	**61.81 Total 5.15 Average**	**50.5 Average**	**77.6 Average**
Wet Season (Oct-Apr)	**6.14 Total**	**21.80 Total**	**42.1 Average**	**62.3 Average**
Dry Season (May-Sep)	**0.50 Total**	**40.01 Total**	**62.3 Average**	**93.6 Average**

[1] National Weather Service-Western Regional Climate Center 1955-2015: http://www.wrcc.dri.edu/
[2] CIMIS Station 21 report run 5/6/2015.

B. Operational Characteristics

1. Operating Rules and Regulations

The District's water delivery system is classified as a fixed duration-restricted, arranged demand system with deliveries arranged in advance and a normal duration in 24-hour time intervals. By contract with DWR and under the District's Rules and Regulations, daily water requests for a continuous and constant rate are to be made at least 24 hours in advance, with adjustments made at 9:00 a.m. each day. In practice, the District and DWR attempt to accommodate adjusting water deliveries on a day-to-day basis and

since 2003 DWR has allowed mid-day delivery reductions to minimize electrical use during peak periods.

Water is allocated evenly to each acre within District's Water Service Area, which includes those lands within the original District boundaries that have requested water service. Lands within the original District boundaries that have not requested water service and lands that have been annexed into the District are not allocated a water supply, but can use water allocated to other lands.

Refer to Exhibit 6 for a copy of the District's Operating Rules and Regulations, adopted on December 8, 2010.

2. Water Delivery Measurements or Calculations

The District has five metered turnouts off the Aqueduct that serve a total of five agricultural water users. Four turnouts serve individual water users exclusively; the remaining turnout (DR2) is shared among three water users. Refer to Worksheet 5 for a summary of the District's water measurement devices.

Worksheet 5. Water Delivery Measurements

Measurement Device	Frequency of Measurement (Days)	Frequency of Calibration (Months)	Frequency of Maintenance (Months)	Estimated Level of Accuracy
Propeller Meters	Daily	As needed	As needed	± 5%
Flumes	Daily	As needed (by DWR)	As needed (by DWR)	3%-5%
Venturi Meters	Daily	As needed (by DWR)	As needed (by DWR)	± 2%

3. Water Rate Schedules and Billing

District costs are allocated to landowners and water users via three types of charges:

Benefit Assessments – Levied on a per relative land valuation basis with valuations varying based on whether the property has a water allocation or not; these charges include all SWP fixed costs and minimum District administrative costs. These charges are levied in February and are due in equal installments on July 1 and November 1 of each year.

Standby Charges – Levied on a per acre basis to all lands that have ever received a water allocation; these charges include most District administrative costs and system maintenance costs. Charges vary within seven primary standby charge service areas, based on the maintenance requirements for the distribution system in each service area. These charges are levied in February and are due in equal installments on March 1 and July 1 of each year.

Water Toll Charges – Levied at a uniform block rate on a per acre-foot basis of water delivered to each farming operation; these charges include variable and off-aqueduct

SWP costs and District costs associated with water deliveries. These charges are levied in February (due on March 1) based on scheduled deliveries from January through June, and in June (due on July 1) based on actual and scheduled deliveries from January through December.

It is the Board's policy to make year-end adjustments to reflect actual costs incurred for the year. Standby charges and water toll charges may also be adjusted during the course of the year, if necessary. This policy insures that each year, each water user and landowner is charged their appropriate share of that year's water cost.

4. Drought Management Plan and Water Shortage Allocation Policy

As described later in Section III:F the District relies on its diverse water supply portfolio as its primary mechanism for enduring periods of drought. Unlike farmers in other areas who can fallow lands during periods of drought, farmers in the District have permanent plantings (trees and vines) that require a minimum water supply to keep alive. In water short years these farmers use deficit irrigation (the application of water below full crop-water requirements) to reduce irrigation water use. This can result in reduced crop yields and, if taken to the extreme, no crop yield and long-term damage.

Determining Drought Severity

The District's primary water source is imported surface water supplies from the SWP. In the fall of each year, DWR operations staff review current Project storage and projected deliveries through the end of the year, and develop allocation projections for the following year based on a range of forecasted hydrology. DWR declares the initial allocation forecast for the following year at the end of November; this allocation is adjusted up or down as hydrology dictates.

District management maintains a close relationship with DWR operations staff and uses these allocation projections to determine water supply availability and level of drought severity. These projections are conveyed to District landowners for use in planning their farming operations and projecting supplemental water needs.

Water Shortage Allocation

Rule 5 of the District's Operating Rules and Regulations (Exhibit 6) addresses the allocation of District water supplies:

> Each acre of land in the District's Water Service Area (excepting those subordinately annexed lands which, by virtue of a contract with the District, have received an annual entitlement for SWP Table A water as a result of an approved transfer) shall be allocated the same quantity of Table A Contract Water such that the total is equal to Table A Contract Water which is available to the District. Any other water available to the District, including water not needed by water users, shall be offered to the other water users as it becomes available; if requests for such other water exceed the supply for water available, the water shall be allocated in

proportion to the Water Service Area acreage attributed to each requesting water user, up to the water user's request.

Alternative Water Supplies

As discussed later in Section III:F, the District relies on banking, transfers, and exchanges to supplement its annual water supply. At all but the higher SWP water allocations, the District is proactive in seeking and securing supplemental water supplies. Since 2009, the District has collaborated in securing additional water with four other agricultural water districts that also rely heavily on the SWP for their water supplies. The other districts are member units of the Kern County Water Agency and consist of Belridge Water Storage District, Berrenda Mesa Water District, Lost Hills Water District, and Wheeler Ridge–Maricopa Water Storage District. Due to their common location on the Westside of the southern San Joaquin Valley, the five districts are informally referred to at the Westside Districts or Westside 5 ("WS5").

Coordination and Collaboration

As discussed later in Section III:F, in addition to the WS5, the District coordinates with neighboring local districts where there are common landholders to utilize limited supplies in the most beneficial manner.

Revenues and Expenditures

The majority of the District's expenses are DWR charges that are due regardless of the amount of water delivered. As the SWP allocation gets reduced, the actual cost of the water to the water users increases proportionately. For example, the District is expected to spend $4.4 million for its 2015 SWP water supply. At 100% allocation, this would equate to approximately $97/AF, but at the 2015 allocation of 20%, the unit charge rises to over $485/AF.

In addition, at lower SWP allocations, the market for supplemental water becomes more active, which results in higher unit costs to the water users.

Section III: Description of Quantity of Water Uses

A. Agriculture Water Use

The representative year used in the remainder of the worksheets in this Plan is 2010. This year was chosen for the following reasons:

- The 50% Table A allocation is thought to be generally representative of future average conditions.
- Article 21 and Multi-Year Water Pool water (a replacement for the Turnback Pool), historically unallocated and available in "as needed and as available" quantities, are now anticipated to typically be allocated among SWP contractors based on Table A amounts due to the increasing demands on the SWP.
- Imported water from landowners is anticipated to be reflective of future conditions.
- Near-future landowner water demands are projected to be similar to those in 2010.

Although a significant quantity of Dry Year Purchase and Yuba Accord water was purchased in 2010 (which may not be available at a suitable price or quantity in future years), the total water transferred into and out of the District is considered to be representative of future years, regardless of the source.

Worksheet 6. Annual Agricultural Water Use (AF)

Source	2010	2013	2014	2015
Agricultural Water Supplier Delivered				
SWP Allocation	50%	35%	5%	*25%*
Surface Water	31,501	31,943	17,002	*9,070*
Other Water Supplies Used				
Imported Landowner Water	30,095	7,646	11,975	
Total	**61,596**	**39,589**	**28,977**	

Worksheet 7. 2010 Agricultural Crop Data

Crop	Total Acreage	ET crop[1] (AF/Ac)	Leaching[2] Requirement (AF/Ac)	Cultural[3] Practices (AF/Ac)	Total Crop Water Needs (AF/Ac)	Total Crop Water Needs (AF)
Almonds	4,985	3.68	0.28	0.13	4.08	20,363
Grapes	1,138	2.56	0.41	0.00	2.97	3,381
Pistachios	7,749	3.38	0.31	0.00	3.69	28,580
Pomegranates	2,588	3.49	0.16	0.00	3.65	9,457
Stone Fruit	1,178	3.35	0.29	0.13	3.77	4,437
Total Irrigated	**17,638**	**60,419**	**5,029**	**770**		**66,218**
Non-Farmed	19,982					
Total	**37,620**					

[1] Crop ET obtained from Etc Table for Irrigation District Water Balances, ITRC, Zone 16 for typical year.
[2] Leaching requirement developed from Journal of Irrigation and Drainage Division data to maintain 100% yield potential.
[3] Frost protection water.

Worksheet 7. 2013 Agricultural Crop Data

Crop	Total Acreage[1]	ET crop[2] (AF/Ac)	Leaching[3] Requirement (AF/Ac)	Cultural[4] Practices (AF/Ac)	Total Crop Water Needs (AF/Ac)	Total Crop Water Needs (AF)
Almonds	4,913	3.68	0.28	0.13	4.08	20,069
Grapes	1,282	2.56	0.41	0.00	2.97	3,808
Pistachios	7,375	3.38	0.31	0.00	3.69	27,201
Pomegranates	1,774	3.49	0.16	0.00	3.65	6,482
Stone Fruit	298	3.35	0.29	0.13	3.77	1,123
Total Irrigated	**15,642**	**53,466**	**4,566**	**651**		**58,683**
Non-Farmed	21,978					
Total	**37,620**					

[1] From 2014 GIS data.
[2] Crop ET obtained from Etc Table for Irrigation District Water Balances, ITRC, Zone 16 for typical year.
[3] Leaching requirement developed from Journal of Irrigation and Drainage Division data to maintain 100% yield potential.
[4] Frost protection water.

Worksheet 7. 2014 Agricultural Crop Data

Crop	Total Acreage[1]	ET crop[2] (AF/Ac)	Leaching[3] Requirement (AF/Ac)	Cultural[4] Practices (AF/Ac)	Total Crop Water Needs (AF/Ac)	Total Crop Water Needs (AF)
Almonds	4,913	3.68	0.28	0.13	4.08	20,069
Grapes	1,245	2.56	0.41	0.00	2.97	3,699
Pistachios	7,375	3.38	0.31	0.00	3.69	27,201
Pomegranates	1,774	3.49	0.16	0.00	3.65	6,482
Stone Fruit	169	3.35	0.29	0.13	3.77	637
Total Irrigated	**15,476**	**52,939**	**4,513**	**635**		**58,087**
Non-Farmed	22,144					
Total	**37,620**					

[1] From 2014 GIS data.
[2] Crop ET obtained from Etc Table for Irrigation District Water Balances, ITRC, Zone 16 for typical year.
[3] Leaching requirement developed from Journal of Irrigation and Drainage Division data to maintain 100% yield potential.
[4] Frost protection water.

Worksheet 7. 2015 Agricultural Crop Data

Crop	Total Acreage[1]	ET crop[2] (AF/Ac)	Leaching[3] Requirement (AF/Ac)	Cultural[4] Practices (AF/Ac)	Total Crop Water Needs (AF/Ac)	Total Crop Water Needs (AF)
Almonds	5,453	3.68	0.28	0.13	4.08	22,275
Grapes	1,245	2.56	0.41	0.00	2.97	3,699
Pistachios	7,762	3.38	0.31	0.00	3.69	28,628
Pomegranates	1,937	3.49	0.16	0.00	3.65	7,078
Stone Fruit	225	3.35	0.29	0.13	3.77	848
Total Irrigated	**16,622**	**56,989**	**4,828**	**710**		**62,527**
Non-Farmed	20,998					
Total	**37,620**					

[1] From 2014 GIS data.
[2] Crop ET obtained from Etc Table for Irrigation District Water Balances, ITRC, Zone 16 for typical year.
[3] Leaching requirement developed from Journal of Irrigation and Drainage Division data to maintain 100% yield potential.
[4] Frost protection water.

B. Environmental Water Use

The terminal spill reservoir on Canal 2-E, constructed in 1990 to mitigate for the Canal 3-S lining project, historically was used as for regulation and tailwater return. Subsequent landowners' improvements have eliminated its use. No environmental resources are currently supported directly by the District's water supplies.

C. Recreational Water Use

No recreational resources are supported by the District's water supplies.

D. Municipal and Industrial Use

Although there are individually owned and operated domestic systems that provide small quantities of water for farm operations, shop buildings, and farm housing, these are minor and incidental to the operation of the District. No municipal and industrial resources are supported by the District's water supplies.

E. Groundwater Recharge Use

No groundwater recharge resources located within the District are supported by the District's water supplies. However, as presented in Section IV:, the District participates in groundwater banking programs with the San Gabriel Valley Municipal Water District, the Cawelo Water District, the Semitropic Water Storage District, and the Kern Water Bank Authority.

F. Transfer and Exchange Use

The District relies on transfers and exchanges to supplement its annual water supply. Worksheet 8 illustrates the recent transfer and exchange history for the District.

Worksheet 8. Transfers and Exchanges Water Uses (AF)

Source	2010	2013	2014	2015
Browns Valley Irrigation District	0	1,085	1,240	*1,163*
Butte County	0	727	101	*260*
Cawelo Water District	0	874	3,554	*2,000*
Dry Year Transfer Program	543	3,024	5,096	*209*
Kern County Water Agency	965	0	0	
Kern Water Bank Authority	13,844	3,700	16,789	*14,590*
Merced Irrigation District	638	0	0	
Multi-Year Water Pool	0	5,352	40	*55*
San Gabriel Valley Municipal Water District	0	1,500	240	
Tulare Lake Basin Water Storage District	1,544	8,099	488	*617*
Turnback Pool	156	60	0	
Westlands Water District	0	0	35	*7*
Yuba Accord	1,045	1,095	996	*155*
Total Transfers/Exchanges In	**18,735**	**25,516**	**28,579**	
Central Coast Water Authority	0	(1,090)	(860)	
Kern County Water Agency	(10,317)	(6,941)	(10,786)	*(16,950)*
Kern Water Bank Authority	(304)	0	0	
Metropolitan Water District of Southern CA	0	0	(846)	*(452)*
San Gabriel Valley Municipal Water District	(4,780)	(672)	0	
Tulare Lake Basin Water Storage District	(1,544)	0	0	
Westlands Water District	0	(500)	0	*(850)*
Total Transfers/Exchanges Out	**(16,945)**	**(9,203)**	**(12,492)**	
Net Transfers/Exchanges	**1,790**	**16,313**	**16,087**	

The viability of water transfers is a critical element of the Plan. Transfers between the District and other SWP contractors (i.e., Kern County Water Agency, Tulare Lake Basin Water Storage District, San Gabriel Valley Municipal Water District, Butte County, etc.) and non-Project agencies (i.e., Browns Valley Irrigation District, Merced Irrigation District, and various Feather River and CVP contractors and other water purveyors that have augmented the District's supply via Dry Year Water Programs, Westside Districts) have historically been, and continue to be, critical water management tools for the District to efficiently manage its water supplies (direct transfers or by exchanges); typical water management methods have included water deliveries:

- In and out of long-term banking and exchange programs (i.e., Kern Water Bank Authority, Cawelo Water Regulation Program, Semitropic Water Exchange, San Gabriel Valley Water Exchange, Irvine Ranch Water District's Strand Ranch and Stockdale Integrated Banking Projects, etc.);

- In and out of short-term or spot market groundwater banking programs or exchanges (i.e., Rosedale Rio-Bravo Water Storage District, Central Coast Water Agency, etc.);
- Annual water purchases, including Dry Year Transfer Programs and purchases of non-Project (non-SWP) via the District or the Westside Districts;
- Multi-year water purchases of SWP or non-Project water via the District or the Westside Districts (i.e., Multi-Year Water Pool, Castaic Lake Water Agency, Western Hills Water District, etc.);
- To or from other water districts that District landowners have agricultural landholdings, whereby annual water needs can be facilitated by transferring water within a common farming operation (located in multiple water districts) to balance their water supplies where it has the most economic benefit. Historically, common landowner transfers have occurred with member units of the Kern County Water Agency, Tulare Lake Basin Water Storage District, Green Valley Water District, Westlands Water District, and various non-Project water districts located on the eastside of the southern San Joaquin Valley. Future common landowner transfers may be anticipated in other water districts in Kings, Kern, Tulare, Fresno, Merced and Madera counties where District landowners have landholdings and farming operations that involve SWP water or non-Project water.

The District intends to rely on these and similar transfers and exchanges with other water entities to provide the necessary flexibility to optimize beneficial use of the water supplies, exchanges, and storage facilities available to the District and its growers, including:

- Transfers to/from other SWP contractors (or their member units) for annual or multi-year exchanges;
- Transfers to/from non-Project water purveyors for annual or multi-year exchanges;
- Transfers to/from other SWP contractors (or their member units) with established water banking or exchange programs;
- Transfers to/from CVP contractors (or their member units) with established water banking or exchange programs or for annual or multi-year purchases or exchanges;
- Transfers to/from non-project (SWP or CVP) with established water banking or exchange programs or for annual or multi-year purchases or exchanges.

Section IV: Description of Quantity and Quality of the Water Resources of the Agricultural Water Supplier

A. Water Supply Quantity

1. Surface Water Supply

The District's primary water source is surface water supplies from the SWP; the District does not pump local groundwater due to its low yields and poor quality. In addition to the SWP supplies, water has been made available through programs from water stored in off-site groundwater basins and from purchases, transfers, and exchanges with other water agencies. The surface water supply is comprised of SWP Table A contract amount (currently 45,350 AF), other SWP water (including Article 21, Multi-Year Water Pool, and Turnback Pool water), and non-Project water obtained outside the District (including, as available, imported landowner water, Dry Year Transfer Program water, Yuba Accord water, and multi-year transfers with Butte County, Browns Valley Irrigation District, and Western Hills Water District) which are delivered to the District or to its banking/exchange programs. In drier years, the supply is heavily supplemented by water recovered from groundwater storage programs in which the District participates; in average to wet years, the supply is mostly or exclusively from SWP surface water sources. These water supplies are described below; Worksheet 9 summarizes water deliveries for the representative year and years 2013-2015.

- SWP Table A Contract Amount: This is the maximum amount of SWP water that the District can request each year in accordance with the District's long-term water supply contract. In 2009, the District (on behalf of a landowner in the District) permanently transferred 14,000 AF of its SWP Table A contract amount to Mojave Water Agency. The transfer was in phased amounts, with 7,000 AF transferred in 2010, 3,000 AF transferred in 2015, and the remaining 4,000 AF to be transferred in 2020. In 2013, the District (on behalf of another landowner in the District) permanently transferred 1,993 AF of its SWP Table A contract amount to Antelope Valley-East Kern Water Agency. The District's current SWP Table A contract amount is 45,350 AF.
- SWP Article 21: This water is made available for delivery on a short-term basis as determined by DWR when SWP water remains available on a real-time basis after operational requirements for Project water deliveries, water quality, and other regulatory requirements have been met. The last time SWP Article 21 water was made available was in 2011.
- SWP Turnback Pool Program: This program allows SWP contactors to offer a portion of their allocated Table A water for sale to other SWP contractors. This water is combined into a pool and allocated to purchasers based on their proportionate Table A contract amounts. The amount of water made available through the Turnback Pool has continued to decline, no Turnback Pool water has been available since 2013, and the future of this program is tenable.
- Multi-Year Water Pool Demonstration Program: This demonstration program was initiated by DWR for the two-year period 2013-14 and was re-instated for 2015-16. The program allows SWP contactors to offer a portion of their allocated Table

A water for sale to other SWP contractors, with higher returns available to the sellers than what is available through the Turnback Pool. The amount of water made available through the Multi-Year Water Pool has also continued to decline from its high in 2013, primarily due to reduced SWP carryover water available and the low SWP water allocations in recent years.

- Dry Year Transfer Program: This program was initiated by DWR in 2001 and allows for the purchase of non-Project water north of the Delta (made available through land fallowing, groundwater substitution, and reservoir releases) for delivery to SWP contractors. The program has been used extensively, based on the annual need for additional water by SWP and potentially other water agencies.
- Yuba Accord: This program allows for the purchase of non-Project water north of the Delta (made available through land fallowing, groundwater substitution, and reservoir releases) for delivery to SWP and other water contractors.
- Imported Landowner Water: Some landowners have surface and groundwater supplies available from other local sources that are conveyed to the District instead of being used on other agricultural lands they own. When imported to the District, this allows these landowners more flexibility in meeting demands and reducing the amount of recovery required from banking/exchange programs.

As has occurred in the past, the District intends to continue to engage in water transfers and exchanges with other SWP contractors and other water agencies throughout the State. Potential single- or multi-year arrangements with SWP contractors could include water agencies (or their member units) from Plumas County in the north to Metropolitan Water District of Southern California in the south. Potential non-Project (non-SWP) partners include, but are not limited to, water agencies within the Central Valley Project ("CVP") service area (Friant Water Users Authority, San Luis & Delta Mendota Water Authority, and Sacramento Valley contractors), San Joaquin Tributaries Authority, and non-CVP districts within the Northern California Water Association.

Worksheet 9. Surface Water Supplies (AF)

Source	2010	2013	2014	2015
SWP Table A	25,172	17,620	2,418	*9.070*
Prior Year Carryover[1]	10,002	15,162	16,858	*18,361*
Imported Landowner Water	30,095	7,646	11,975	
Transfers/Exchanges into District	18,735	25,516	28,579	
Total Supply	**84,004**	**65,944**	**59,830**	
Transfers/Exchanges out of District	(16,945)	(9,203)	(12,492)	
Carryover into Next Year[1]	(5,463)	(17,152)	(18,361)	
Total Used in District	**61,596**	**39,589**	**28,977**	

[1]Carryover adjusted between 2013 and 2014 to account for prior year adjustments.

When delivery capacity in the Aqueduct is limited, the water supply contract with DWR can contractually limit the District to a maximum monthly delivery of 18% of the District's Table A amount, or 8,163 AF (~137 cfs). Historically, the District has consistently

exceeded the 18% limit during the month of July, with deliveries about 20% of the annual Table A amount; this pattern of demand is typical for agricultural areas on the west side of the San Joaquin Valley. To date, DWR has not had to enforce the 18% limitation on the District.

Over the next five years, it is anticipated that statewide demand for Project and supplemental water supplies (including Article 21, Turnback Pool, Multi-Year Water Pool Program, Dry Year Transfer, and Yuba Accord water) will increase slightly, resulting in smaller delivery allocations and less water being made available for District use, particularly the availability of Article 21 and Turnback Pool water. Also, the continuation of the Multi-Year Water Pool Program is uncertain.

Although the District's only long-term contractual water supply is for SWP water, approximately 5,000 acres in the northeast portion of the District are located within the permitted Place of Use for CVP water, specifically the Consolidated Place of Use (Westside CVP water) and the Friant Place of Use (irrigation only boundary and the irrigation and M&I boundary).

2. Groundwater Supply

Although the District lies within the boundaries of what is defined as the Tulare Lake groundwater basin, it is categorized by DWR in Bulletin 118 as having "groundwater unavailable and/or unusable". All agricultural wells in the area have been abandoned due to poor yield and poor water quality. Only one small domestic well is known to be in use within the District.

As noted in the following section, the District has developed or participated in groundwater banking projects located elsewhere in the State to increase the dry year reliability of its water supply.

However, the District is located within the Tulare Lake Subbasin (Subbasin 5-22.12) of the Tulare Lake Hydrologic Basin per DWR Bulletin 118. Although lands in the District have little impact on groundwater of the Subbasin, the District has been meeting and corresponding with other water purveyors and landowners in the Subbasin and is planning to comply with the Sustainable Groundwater Management Act ("SGMA").

3. Other Water Supplies

Allocation studies by DWR have estimated the delivery capability of the SWP supply at 62% (Draft Technical Addendum to The State Water Project Delivery Capability Report 2015, April 2015). As a result of declining SWP delivery capability[1], the District has aggressively pursued opportunities to supplement and increase the reliability of the

[1] SWP delivery capability has steadily declined from 72% when the first DWR report on the reliability (delivery capability) of the SWP was published (State Water Project Delivery Reliability Report 2002, finalized in 2003) to the current 62% level.

SWP surface supply. The following programs represent the current agreements the District has entered into to increase dry/average year supplies for its water users.

San Gabriel Valley Municipal Water District

Under a 1995 agreement with the San Gabriel Valley Municipal Water District ("SGVMWD"), which was subsequently amended and restated in 2002 and again in 2005, landowners within the District are able to store water with SGVMWD, either by direct delivery or by exchange, for return by exchange to the District in later years. Program details include:

- 12,500 AF storage account capacity, 95% recovery of delivered water.
- Program terminates at end of 2020; District can recover up to ten years after program termination.
- Water physically delivered to SGVMWD (direct delivery).
    - Delivery limited based on SGVMWD pipeline capacity, groundwater levels, and local weather conditions.
    - Return available only after SGVMWD gets the first 10,000 AF of their SWP supply (~35% Table A allocation).
- Water delivered to SGVMWD by exchange (reclassification).
    - Delivery limited to 3,000 AF per year (unless managers agree to increase).
    - Return available only if Table A allocation is 50% or greater.

Cawelo Water District

Under a 2001 agreement with the Cawelo Water District ("CWD"), which was subsequently amended and restated in 2002, landowners within the District receive the benefit of "regulation program" water and are also able to store water through "in-lieu banking" for extraction in later years. Program details include:

- 50,000 AF storage capacity, 94% recovery of in-lieu banked water.
- Program intended to continue along with SWP contracts; earliest termination at the end of 2035; District can recover water for up to 5 years after program termination.
- Regulation program
    - District account builds up at 600 AF per year beginning in 2003; plus 2,000 AF in both 2003 and 2008.
    - District recovery of up to 2,000 AF per year of CWD SWP water on account.
- In-lieu banking program
    - At discretion of CWD—recharge via District providing and delivering water to CWD when CWD wells can be turned off.
    - Recovery up to 2,000 AF per year of CWD's allocation of SWP water.

Semitropic Water Storage District

Under a 2008 agreement with the Semitropic Water Storage District ("SWSD"), landowners within the District are able to store water with SWSD, either by direct delivery or by exchange, for return by exchange to the District in later years. Program details include:

- Lowest priority for storage and recovery.
- 10% recharge/conveyance loss.

Kern Water Bank
Under a 1995 agreement with DWR, the District chose to permanently relinquish 4,330 AF of its Table A contract amount in exchange for a 9.62% share of the Kern Water Bank ("KWB"), a groundwater banking facility located in western Kern County, owned and operated by the Kern Water Bank Authority ("KWBA"). The District is one of six entities participating in the KWB. During the formation of the KWBA, the District landowners were provided an opportunity to participate in the KWB program; landowners representing 45% of the land within the District's Water Service Area chose to participate. Program details include:

- 144,300 AF storage capacity (estimated total KWB storage of 1,500,000 AF), 6% recharge/conveyance loss, additional 4% available for purchase by neighboring Kern County districts.
- Minimum recharge capacity of 3,688 AF per month (estimated KWB recharge capacity of 460,000 AF per year).
- Minimum recovery capacity of 1,924 AF per month (estimated KWB recovery capacity of 240,000 AF per year).

Common Landowner Transfer Agreements
Under two 2011 agreements with the Kern County Water Agency and a 2012 agreement with Tulare Lake Basin Water Storage District, the District has established long-term water transfer agreements approved by DWR to allow common landowner transfers of SWP water between the District and each of these water agencies.

San Joaquin Valley Water Districts
Prior to 2009, the District had made case-by-case transfers or exchanges with other water districts to best manage their water supplies; generally, such transfers/exchanges had been with adjoining neighboring water districts in the San Joaquin Valley (i.e., Lost Hills Water District and Tulare Lake Basin Water Storage District), but have also included transfers and/or exchanges with others, including Central Coast Water Authority, Kern County Water Agency, Rosedale-Rio Bravo Water Storage District, Berrenda Mesa Water District, Belridge Water Storage District, and Westlands Water District. Since 2009, in addition to most of the above-mentioned districts, the District has also engaged in transfers with Merced Irrigation District, North Kern Water Storage District, Shafter-Wasco Irrigation District, South San Joaquin Municipal Utility District, Arvin-Edison Water Storage District, and St. Johns Water District.

Programs with the Westside Districts
As mentioned in Section II.B.4, in 2009 the District entered into an agreement (subsequently amended in 2011) with four member units of the Kern County Water Agency (Belridge Water Storage District, Berrenda Mesa Water District, Lost Hills Water District, and Wheeler Ridge–Maricopa Water Storage District) to cooperatively develop and manage supplemental water supplies for their mutual benefit. Under this agreement each district shares supplemental water obtained by their district with the other four

districts in proportion to their participation percentage; the District is allocated 14.34% of the supplemental supplies obtained under this agreement. These five districts ("Westside Districts" or "WS5"), have developed numerous water reliability programs, including a long-term water supply program with Western Hills Water District, multi-year water purchase programs with Butte County, Browns Valley Irrigation District, and Tehachapi-Cummings County Water District as well as annual water purchase programs with Arvin-Edison Water Storage District, Castaic Lake Water Agency, North Kern Water Storage District, Delano-Earlimart Irrigation District, Exeter Irrigation District, Fresno Irrigation District, Gravelly Ford Water District, Lindmore Irrigation District, Lower Tule River Irrigation District, Madera Irrigation District, Porterville Irrigation District, Shafter-Wasco Irrigation District, and West Kern Water District.

4. Drainage From the Water Supplier's Surface Area

Landowners are required by the District to maintain applied water on their lands—privately operated tailwater/spill recovery systems are in place to accomplish this element of water management, although these needs are minimized by the use of low-volume drip and micro-sprinkler systems on all irrigated lands.

A large landowner in the northern half of the District has several surface water storage reservoirs, constructed primarily to capture, store, and recirculate Article 21 water supplies which are typically available in large volumes over short periods of time. While these reservoirs are unlined, stored water is quickly diverted for irrigation in an effort to most beneficially use the surplus supplies. Although the District has not quantified seepage losses and/or deep percolation from these landowner-operated facilities, it is estimated that these facilities contribute to the percolation losses shown in Worksheet 17.

B. Water Supply Quality

1. Surface Water Supply

Except for the moss/algae issues described previously, there have been no water quality problems that limit the use of the SWP water within the District. Worksheet 10 provides recent water quality data at DWR Check 21.

Worksheet 10. Water Delivery Measurements

Parameter	Units	2014 Average	2014 Range
Alkalinity	mg/L as CaCO3	92	83 - 99
Aluminum	mg/L	0.028	<0.01 - 0.131
Ammonia	mg/L as N	0.04	0.01 - 0.16
Antimony	mg/L	<0.001	
Arsenic	mg/L	0.003	<0.001 - 0.005
Barium	mg/L	0.03	0.026 - 0.041
Beryllium	mg/L	<0.001	
Boron	mg/L	0.3	0.2 - 0.3

Bromide	mg/L	0.36	0.27 - 0.44
Cadmium	mg/L	<0.001	
Calcium	mg/L	26	23 - 31
Chloride	mg/L	112	85 - 134
Chromium	mg/L	<0.001	
Conductance (EC)	µS/cm	697	587 - 785
Copper	mg/L	0.002	0.001 - 0.004
Hardness	mg/L as CaCO3	137	126 - 154
Iron	mg/L	0.028	0.005 - 0.131
Lead	mg/L	<0.001	
Magnesium	mg/L	18	17 - 20
Manganese	mg/L	0.02	0.008 - 0.037
Mercury	mg/L	<0.0002	
Nickel	mg/L	0.001	0.001 - 0.002
Nitrate + Nitrite	mg/L as N	0.20	<0.01 - 0.57
Organic Carbon, Dissolved	mg/L as C	4.5	3 - 6.1
Organic Carbon, Total	mg/L as C	4.6	2.8 - 6.4
pH		8.7	8.3 - 9.05
Phosphate, Ortho	mg/L as P	0.07	<0.01 - 0.11
Phosphorus	mg/L	0.09	0.04 - 0.14
Selenium	mg/L	0.002	0.001 - 0.003
Silver	mg/L	<0.001	
Sodium	mg/L	85	64 - 112
Sulfate	mg/L	69	52 - 137
Total Dissolved Solids	mg/L	394	329 - 470
Turbidity	N.T.U.	3	<1 - 11
Zinc	mg/L	<0.005	
Source: DWR Water Data Library http://www.water.ca.gov/waterdatalibrary/waterquality/station_county/index.cfm			

C. Water Quality Monitoring Practices

1. Source Water

DWR maintains an automated sampling station at Check 21 (just upstream from the District turnouts) that records electrical conductivity, water temperature, and turbidity on a daily basis. In addition, grab samples are taken on monthly intervals. Worksheet 11 summarizes sampled constituents and sampling frequency:

Worksheet 11. SWP Water Quality Parameters

Constituent	Sampling Frequency	Notes
Project Standard	Monthly	1
Total Organic Carbon	Monthly	
Dissolved Organic Carbon	Monthly	
Suspended Solids	Monthly	
Bromide	Monthly	
Pesticides and Herbicides	March, June, September	2
MTBE (Purgeable organics)	March, June, September	
Asbestos	Monthly	
Electrical Conductivity	Daily	3
Temperature	Daily	3
Turbidity	Daily	3

[1] Includes Alkalinity, Al, Sb, As, Ba, Be, B, Cd, Ca, Cl, Cr, Cu, F, Fe, Pb, Mg, Mn, Hg, NO_3, Se, Ag, Na, Dissolved Solids, Specific Conductance, SO_4, Turbidity, Zn.
[2] Includes chlorinated organic, organo-phosphorus pesticides, herbicides, carbamates, misc. pesticides.
[3] Daily readings from an automated station.

Section V: Water Accounting and Water Supply Reliability

A. Quantifying the Water Supplier's Water Supplies

Worksheet 12 illustrates the District's water supplies in the representative year. The District routinely transfers and/or exchanges water to and from various entities as part of its normal operations. As the table below illustrates for the representative year (and is typical in other years), water may be transferred out of and into the District from the same source during the same year (or as part of a multi-year program). This flexibility is required to make the best annual and long-term use of the District's limited and variable water supplies.

1. Agricultural Water Supplier Water Quantities:

Worksheet 12. 2010 Surface and Other Water Supplies (AF)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SWP Table A	0	0	0	0	0	4500	4641	514	1653	5144	1822	1435	19709
Prior Year Carryover	0	0	0	0	0	0	2646	5356	2000	0	0	0	10002
Allocated Water	0	0	0	0	0	4500	7287	5870	3653	5144	1822	1435	29711
Dry Year Transfer Program	0	0	0	0	0	0	200	206	137	0	0	0	543
Kern County Water Agency	0	0	0	0	0	0	0	965	0	0	0	0	965
Kern Water Bank Authority	109	114	285	1097	3014	6535	2607	0	0	0	0	0	13844
Merced Irrigation District	0	0	0	0	0	0	0	0	638	0	0	0	638
Tulare Lake Basin WSD	0	0	0	0	0	0	0	993	551	0	0	0	1544
Turnback Pool	0	0	0	0	0	0	156	0	0	0	0	0	156
Yuba Accord	0	0	0	0	0	0	382	379	284	0	0	0	1045
Transfers/Exchanges In	109	114	285	1097	3014	6535	3345	2543	1610	0	83	0	18735
Kern County Water Agency	0	0	0	0	0	-4500	-2667	-410	-1290	-950	-400	-100	-10317
Kern Water Bank Authority	0	0	0	0	0	0	0	0	0	0	0	-304	-304
San Gabriel Valley MWD	0	0	0	0	0	0	0	0	0	-2500	-1296	-984	-5084
Tulare Lake Basin WSD	0	0	0	0	0	0	0	-993	-551	0	0	0	-1544
Transfers/Exchanges Out	0	0	0	0	0	-4500	-2667	-1403	-1841	-3450	-1696	-1388	-16945
Imported Landowner Water	100	150	300	1000	2960	6950	7190	6650	2920	1675	200	0	30095
Total	**209**	**264**	**585**	**2097**	**5974**	**13485**	**15155**	**13660**	**6342**	**3369**	**409**	**47**	**61596**

Worksheet 12. 2013 Surface and Other Water Supplies (AF)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SWP Table A	0	0	0	0	0	0	4941	0	0	0	500	0	5441
Prior Year Carryover	803	660	512	66	2434	1102	2045	1090	62	1156	259	0	10189
Allocated Water	803	660	512	66	2434	1102	6986	1090	62	1156	759	0	15630
Browns Valley ID	0	0	0	0	0	0	362	362	361	0	0	0	1085
Butte County	0	0	0	0	0	0	243	242	242	0	0	0	727
Cawelo WD	0	0	0	0	291	291	292	0	0	0	0	0	874
Dry Year Transfer Program	0	0	0	0	0	0	1036	1049	939	0	0	0	3024
Kern Water Bank Authority	0	0	0	0	0	2700	1000	0	0	0	0	0	3700
Multi-Year Water Pool	0	0	0	0	0	0	0	2970	1473	909	0	0	5352
San Gabriel Valley MWD	0	0	0	1000	500	0	0	0	0	0	0	0	1500
Tulare Lake Basin WSD	0	0	0	0	0	2549	4500	1050	0	0	0	0	8099
Turnback Pool	0	0	0	0	0	0	60	0	0	0	0	0	60
Yuba Accord	0	0	0	0	0	0	352	351	392	0	0	0	1095
Transfers/Exchanges In	0	0	0	1000	791	5540	7845	6024	3407	909	0	0	25516
Central Coast WA	0	0	0	0	0	0	0	-1090	0	0	0	0	-1090
Kern County WA	0	0	0	0	0	0	-2000	-4941	0	0	0	0	-6941
San Gabriel Valley MWD	-672	0	0	0	0	0	0	0	0	0	0	0	-672
Westlands WD	0	0	0	0	0	0	0	0	0	0	-500	0	-500
Transfers/Exchanges Out	-672	0	0	0	0	0	-2000	-6031	0	0	-500	0	-9203
Imported Landowner Water	6	1608	1725	661	1649	831	971	195	0	0	0	0	7646
Total	**137**	**2268**	**2237**	**1727**	**4874**	**7473**	**13802**	**1278**	**3469**	**2065**	**259**	**0**	**39589**

Worksheet 12. 2014 Surface and Other Water Supplies (AF)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SWP Table A	0	0	0	0	0	0	0	0	0	1312	0	446	1758
Prior Year Carryover	40	86	110	1026	304	3730	7261	400	0	2946	430	37	16370
Allocated Water	40	86	110	1026	304	3730	7261	400	0	4258	430	483	18128
Browns Valley ID	0	0	0	0	0	0	0	1085	0	0	0	0	1085
Butte County	0	0	0	0	0	0	0	100	0	0	0	1	101
Cawelo WD	0	0	0	0	0	0	2054	1393	0	107	0	0	3554
Dry Year Transfer Program	0	0	0	0	0	0	2441	1442	696	0	0	0	4579
Kern Water Bank Authority	0	282	1700	1555	1592	1596	1552	1539	1400	1400	1400	2773	16789
Multi-Year Water Pool	0	0	0	0	0	0	40	0	0	0	0	0	40
San Gabriel Valley MWD	0	0	0	0	0	0	0	0	240	0	0	0	240
Tulare Lake Basin WSD	0	0	0	0	0	488	0	0	0	0	0	0	488
Westlands WD	0	0	0	0	0	0	0	0	0	30	0	4	34
Yuba Accord	0	0	0	0	0	0	404	403	403	0	0	35	1245
Transfers/Exchanges In	0	282	1700	1555	1592	2084	6491	5962	2739	1537	1400	2813	28155
Central Coast WA	0	0	0	0	0	0	0	0	0	-430	-430	0	-860
Kern County WA	0	0	0	0	0	0	-6100	-400	0	-3800	0	-486	-10786
Metropolitan WD of SC	0	0	0	-846	0	0	0	0	0	0	0	0	-846
San Luis Reservoir Storage	0	-282	-1700	-1555	-1592	-1596	-1552	-1539	-1400	-1400	-1400	-2773	-16789
Transfers/Exchanges Out	0	-282	-1700	-2401	-1592	-1596	-7652	-1939	-1400	-5630	-1830	-3259	-29281
Imported Landowner Water	0	418	863	1829	2728	1578	1480	1058	1421	600	0	0	11975
Total	**40**	**504**	**973**	**2009**	**3032**	**5796**	**7580**	**5481**	**2760**	**765**	**0**	**37**	**28977**

Worksheet 12. 2015 Surface and Other Water Supplies (AF)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SWP Table A	0	0	0	0	0	0	5165	1837	73	0	0		
Prior Year SLR Storage	0	0	0	8200	0	2845	0	5744	0	0	0		
Prior Year Carryover	27	56	156	222	735	369	0	5	0	0	0		
Allocated Water	27	56	156	8422	735	3214	5165	7586	73	0	0		
Browns Valley ID	0	0	0	0	0	0	1163	0	0	0	0		
Butte County	0	0	0	0	0	0	87	87	86	0	0		
Cawelo WD	0	0	0	0	0	0	0	2000	0	0	0		
Dry Year Transfer Program	0	0	0	0	0	0	66	53	0	1	29		
Kern Water Bank Authority	1372	1217	1321	1200	1200	1050	1250	1250	1100	1000	1250		
Multi-Year Water Pool	0	0	0	0	0	0	18	18	19	0	0		
Tulare Lake Basin WSD	0	0	0	0	617	0	0	0	0	0	0		
Westlands WD	0	7	0	0	0	0	0	0	0	0	0		
Yuba Accord	0	0	0	0	0	0	52	52	51	0	0		
Transfers/Exchanges In	1372	1224	1321	1347	1937	1050	2636	3460	1256	1001	1279		
Kern County WA	0	0	0	-8200	0	0	-1250	-7500	0	0	0		
Westlands WD	0	0	0	0	0	0	-850	0	0	0	0		
San Luis Reservoir Storage	-1372	-1217	-1321	-1200	-1200	-1050	-1250	-1250	-1100	-1000	-1250		
Metropolitan WDSC	0	0	0	0	0	0	0	0	0	0	0		
Transfers/Exchanges Out	-1372	-1217	-1321	-9547	-1320	-1050	-3350	-8750	-1100	-1000	-1250		
Total	**27**	**63**	**156**	**222**	**1352**	**3214**	**4451**	**2296**	**229**	**1**	**29**		

2. Other Water Sources Quantities:

Worksheet 13. 2010 Effective Precipitation Summary (AF)

Month	Precipitation (in)	ETo (in)	Almonds 4,985 Ac	Stone Fruit 1,178 Ac	Pistachios 7,749 Ac	Pomegranates 2,588 Ac	Grapes 1,138 Ac	Total
January	3.09	1.19	789	187	1227	410	180	2,793
February	2.23	1.62	253	60	394	132	58	897
March	0.41	4.20	85	10	66	22	19	203
April	1.22	4.93	507	120	788	263	116	1,793
May	0.55	8.01	228	54	355	119	52	808
June	0.00	9.38	0	0	0	0	0	0
July	0.00	9.26	0	0	0	0	0	0
August	0.00	7.07	0	0	0	0	0	0
September	0.00	6.50	0	0	0	0	0	0
October	0.24	4.08	50	12	77	26	6	171
November	1.23	2.43	-	-	-	-	29	29
December	4.19	1.23	-	-	-	-	-	-
2010 Total	**13.16**	**59.90**	**1,913**	**442**	**2,907**	**971**	**460**	**6,694**

Effective Precipitation Assumptions:
1) Rainfall in excess of potential ET goes into storage.
2) Any storage occurring 2 months prior to planting is considered effective.
3) All precipitation during the crop growing season is considered effective except during the first month when only 1/2 the precipitation is effective because of lack of crop cover, and last month when only 1/2 the precipitation is effective because irrigation has been cut off for harvest

Worksheet 13. 2013 Effective Precipitation Summary (AF)

Month	Precipitation (in)	ETo (in)	Almonds 4,913 Ac	Stone Fruit 298 Ac	Pistachios 7,375 Ac	Pomegranates 1,774 Ac	Grapes 1,282 Ac	Total
January	0.25	1.98	0	0	0	0	0	0
February	0.21	2.82	0	0	0	0	0	0
March	0.90	4.67	184	6	138	33	48	409
April	0.05	7.51	20	1	31	7	5	65
May	0.07	8.69	29	2	43	10	7	91
June	0.00	9.54	0	0	0	0	0	0
July	0.00	9.72	0	0	0	0	0	0
August	0.00	8.74	0	0	0	0	0	0
September	0.00	6.92	0	0	0	0	0	0
October	0.00	4.72	0	0	0	0	0	0
November	0.00	2.84	0	0	0	0	0	0
December	0.01	2.20	0	0	0	0	0	0
Total	**1.49**	**70.35**	**233**	**9**	**212**	**51**	**61**	**566**

Effective Precipitation Assumptions:
1) Rainfall in excess of potential ET goes into storage.
2) Any storage occurring 2 months prior to planting is considered effective.
3) All precipitation during the crop growing season is considered effective except during the first month when only 1/2 the precipitation is effective because of lack of crop cover, and last month when only 1/2 the precipitation is effective because irrigation has been cut off for harvest

Worksheet 13. 2014 Effective Precipitation Summary (AF)

Month	Precipitation (in)	ETo (in)	Almonds 4,913 Ac	Stone Fruit 169 Ac	Pistachios 7,375 Ac	Pomegranates 1,774 Ac	Grapes 1,245 Ac	Total
January	0.09	2.58	0	0	0	0	0	0
February	0.20	2.34	0	0	0	0	0	0
March	0.82	1.95	168	3	126	30	43	370
April	0.69	6.04	282	10	424	102	72	891
May	0.31	7.99	127	4	191	46	32	400
June	0.00	7.47	0	0	0	0	0	0
July	0.00	9.62	0	0	0	0	0	0
August	0.00	8.73	0	0	0	0	0	0
September	0.00	6.9	0	0	0	0	0	0
October	0.50	5.09	102	4	154	37	13	310
November	0.32	2.32	0	0	0	0	8	8
December	1.80	1.34	0	0	0	0	0	0
Total	**4.73**	**62.46**	**680**	**20**	**894**	**215**	**168**	**1,977**

Effective Precipitation Assumptions:
1) Rainfall in excess of potential ET goes into storage.
2) Any storage occurring 2 months prior to planting is considered effective.
3) All precipitation during the crop growing season is considered effective except during the first month when only 1/2 the precipitation is effective because of lack of crop cover, and last month when only 1/2 the precipitation is effective because irrigation has been cut off for harvest

Worksheet 13. 2015 Effective Precipitation Summary (AF)

Month	Precipitation (in)	ETo (in)	Almonds 5,453 Ac	Stone Fruit 225 Ac	Pistachios 7,762 Ac	Pomegranates 1,937 Ac	Grapes 1,245 Ac	Total
January	0.27	1.22						
February	0.86	2.50						
March	0.04	5.36						
April	0.15	7.03						
May	0.23	7.57						
June	0.00	9.32						
July	0.19	9.03						
August	0.00	8.67						
September	0.01	6.76						
October	0.35	4.51						
November	0.55	2.55						
December								
Total								

Effective Precipitation Assumptions:
1) Rainfall in excess of potential ET goes into storage.
2) Any storage occurring 2 months prior to planting is considered effective.
3) All precipitation during the crop growing season is considered effective except during the first month when only 1/2 the precipitation is effective because of lack of crop cover, and last month when only 1/2 the precipitation is effective because irrigation has been cut off for harvest

B. Quantification of Water Uses

Worksheet 14. Applied Water (AF)

	2010	2013	2014	2015
Applied Water (from Worksheet 6)	**61,596**	**39,589**	**28,977**	

Worksheet 15. Quantify Water Use (AF)

Water Use	2010	2013	2014	2015
Crop Water Use (from Worksheet 7)				
Crop Evapotranspiration	60,419	53,466	52,939	
Leaching	5,029	4,566	4,513	
Cultural Practices	770	651	635	
Conveyance & Storage System				
Conveyance seepage (estimated 0.5% of deliveries)	308	198	145	
Conveyance evaporation	70	82	77	
Outside the District				
Transfers or Exchanges out of the service area (from Worksheet 8)	(1,790)	(16,313)	(16,087)	
Total Adjusted Water Use	**64,806**	**42,650**	**42,222**	

Worksheet 15 (adjusted) Quantify Water Use (AF)

Water Use	2010	2013	2014	2015
Crop Water Use (from Worksheet 7 with Deficit Irrigation Factor)	100% of ETc	95% of ETc	80% of ETc	
Crop Evapotranspiration	60,419	50,793	42,351	
Leaching	5,029	4,337	3,611	
Cultural Practices	770	619	508	
Conveyance & Storage System				
Conveyance seepage (estimated 0.5% of deliveries)	308	198	145	
Conveyance evaporation	70	82	77	
Outside the District				
Transfers or Exchanges out of the service area (from Worksheet 8)	(1,790)	(16,313)	(16,087)	
Total Adjusted Water Use	**64,806**	**39,716**	**30,605**	

C. Overall Water Budget

Worksheet 16. Quantify Water Supplies (AF)

Water Supplies	2010	2013	2014	2015
Surface Water (summary total from Worksheet 9)	61,596	39,589	28,977	
Groundwater	0	0	0	
Annual Effective Precipitation (summary total from Worksheet 13)	6,694	566	1,977	
Water Purchases	0	0	0	
Subtotal	**68,290**	**40,155**	**30,954**	

Worksheet 17. Budget Summary (AF)

Water Accounting	2010	2013	2014	2015
Subtotal of Water Supplies (from Worksheet 16)	68,290	40,155	31,954	
Subtotal of Water Uses (from Worksheet 15)	(64,806)	(42,650)	(42,222)	
Drain Water Leaving Service Area	0	0	0	
Excess Deep Percolation	**3,484**	**(2,495)**	**(11,268)**	

Worksheet 17 (adjusted). Budget Summary (AF)

Water Accounting	2010	2013	2014	2015
Subtotal of Water Supplies (from Worksheet 16)	68,290	40,155	31,954	
Subtotal of Water Uses (from Worksheet 15 adjusted)	(64,806)	(39,716)	(30,605)	
Drain Water Leaving Service Area	0	0	0	
Excess Deep Percolation	**3,484**	**439**	**349**	

Data from Worksheet 17 for years 2013 and 2014 suggest a Total Water Use Efficiency ("TWUE") for the District of approximately 106% (2013) and 132% (2014), versus the 95% TWUE calculated for the 2010 representative year in the 2012 AWMP. These

results can be attributed to multiple factors: 1) crop water use estimates may be too high, particularly for pomegranates, 2) uncertainties in the crop coefficient values used to estimate crop evapotranspiration, and 3) uncertainties in the salt tolerance threshold values used to estimate the leaching requirements.

In addition, it is probable that the growers are deficit irrigating in response to multiple years of insufficient water supplies. In 2010, the Table A allotment of 50% yielded a corresponding 98% TWUE. At Table A allotments of 35% in 2013 and 5% in 2014, growers would have been forced to abandon (some 2,000 acres have been taken out of production since 2010) or to under-irrigate their remaining crop. Worksheet 15 (adjusted) and 17 (adjusted) illustrate the possible effects of minor (2013) and more severe (2014) deficit irrigation factors to the overall TWUE.

D. Water Supply Reliability

The water supply reliability for the District is parallel to that of the SWP and is best described by DWR in the following excerpts from "The State Water Project Final Delivery Capability Report 2015", dated April 2015.

"Many of the same specific challenges to SWP operations described in the State Water Project Delivery Reliability Report 2013 remain in 2015. Most notably, the effects on SWP pumping caused by issuance of the 2008 and 2009 federal biological opinions (BOs), which were reflected in the 2013 Report, continue to affect SWP delivery capability today. Hence, the differences between the 2013 and 2015 reports can be attributed primarily to updates in the assumptions and inputs to the simulation studies."

Regulatory Restrictions on SWP Delta Exports
"Multiple needs converge in the Delta: the need to protect a fragile ecosystem, to support Delta recreation and farming, and to provide water for agricultural and urban needs throughout much of California. Various regulatory requirements are placed on the SWP's Delta operations to protect special-status species such as delta smelt and spring- and winter-run Chinook salmon. As a result, as described below, restrictions on SWP operations imposed by State and federal agencies contribute substantially to the challenges of accurately determining the SWP's water delivery capability in any given year."

Biological Opinions on Effects of Coordinated SWP and CVP Operations
"Several fish species listed under the federal Endangered Species Act (ESA) as threatened or endangered are found in the Delta. The continued viability of populations of these species in the Delta depends in part on Delta flow levels. For this reason, the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have issued several BOs since the 1990s on the effects of coordinated SWP/CVP operations on several listed species.

These BOs affect the SWP's water delivery capability for two reasons. Most notably, they include terms that restrict SWP exports from the Delta to specific amounts at

certain times under certain conditions. In addition, the BOs' requirements are predicated on physical and biological conditions that occur daily while DWR's water supply models are based on monthly data.

The first BOs on the effects of SWP (and CVP) operations were issued in February 1993 (NMFS BO on effects of project operations on winter-run Chinook salmon) and March 1995 (USFWS BO on project effects on delta smelt and splittail). Among other things, the BOs contained requirements for Delta inflow, Delta outflow, and export pumping restrictions in order to protect listed species. These requirements imposed substantial constraints on Delta water supply operations. Many were incorporated into the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta (1995 WQCP), as described under "Water Quality Objectives" later in this section.

The terms of the USFWS and NMFS, BOs have become increasingly restrictive over the years. In 2004 the United States Bureau of Reclamation (Reclamation) sought a new BO from USFWS regarding the operation of the CVP and SWP (collectively, Projects). USFWS issued the opinion in 2005, finding that the proposed coordinated operations of the Projects were not likely to jeopardize the continued existence of the delta smelt or result in the destruction or adverse modification of its critical habitat. After judicial review, the 2005 BO was vacated and USFWS was ordered to prepare a new one. USFWS found that the proposed operations of the Project would result in jeopardy to the delta smelt and in December 2008 issued a Jeopardy BO which included a Reasonable and Prudent Alternative (RPA) with more protective export restrictions and other actions intended to protect the delta smelt.

Similarly, in 2004 NMFS issued a BO on the effects of the coordinated operation of the Projects on salmonids, green sturgeon and Southern Resident killer whales and found that the proposed operations of the Projects were not likely to jeopardize the continued existence of the listed species or result in the destruction or adverse modification of their critical habitat. After judicial review, the 2004 BO was also vacated and NMFS was ordered to prepare a new one. In June 2009, NMFS issued a new Jeopardy BO covering effects on winter-run and spring-run Chinook salmon, steelhead, green sturgeon, and killer whales. Like the 2008 smelt BO, the salmon BO included an RPA with more protective export restrictions and other actions intended to protect listed species.

The USFWS BO includes requirements on operations in all but 2 months of the year. The BO calls for "adaptively managed" (adjusted as necessary based on the results of monitoring) flow restrictions in the Delta intended to protect delta smelt at various life stages. USFWS determines the required target flow, with the reductions accomplished primarily by reducing SWP and CVP exports. Because this flow restriction is determined based on fish location and decisions by USFWS staff, predicting the flow restriction and corresponding effects on export pumping with any great certainty poses a challenge. The USFWS BO also includes an additional salinity requirement in the Delta for September and October in wet and above-normal water years, calling for increased

releases from SWP and CVP reservoirs to reduce salinity. Among other provisions included in the NMFS BO, limits on total Delta exports have been established for the months of April and May. These limits are mandated for all but extremely wet years.

The 2008 and 2009 BOs were issued shortly before and shortly after the Governor proclaimed a statewide water shortage state of emergency in February 2009, amid the threat of a third consecutive dry year. NMFS calculated that implementing its BO would reduce SWP and CVP Delta exports by a combined 5% to 7%, but DWR's initial estimates showed an impact on exports closer to 10% in average years, combined with the effects of pumping restrictions imposed by BOs to protect delta smelt and other species. Both the 2008 USFWS and 2009 NMFS BOs were challenged in federal court on various grounds, including the failure by the services to use the best available science in the development of the BOs. U.S. District Judge Oliver Wanger found both BOs were not legally sufficient and remanded them to the agencies for further review and analysis. Both decisions were appealed to the Ninth Circuit, and in two separate decisions (March 2014 for the USFWS BO and December 2014 for the NMFS BO) the Ninth Circuit reversed in part and affirmed in part Judge Wanger's rulings, finding the BOs complied with the ESA and upholding them in their entirety. As a result, the operational rules specified in the 2008 and 2009 BOs continue to be legally required and are the rules used in the analyses presented in Section 6 of this report.

The California Department of Fish and Wildlife (DFW) issued consistency determinations for both BOs under Section 2080.1 of the California Fish and Wildlife Code. The consistency determinations stated that the USFWS BO and the NMFS BO would be consistent with the California Endangered Species Act (CESA). Thus, DFW allowed incidental take of species listed under both the federal ESA and CESA to occur during SWP and CVP operations without requiring DWR or the Reclamation to obtain a separate State-issued permit."

Delta Inflows

"Delta inflows vary considerably from season to season, and from year to year. For example, in an above-normal year, nearly 85% of the total Delta inflow comes from the Sacramento River, more than 10% comes from the San Joaquin River, and the rest comes from the three eastside streams (the Mokelumne, Cosumnes, and Calaveras rivers).

The type of water year is also an important factor affecting the volume of Delta inflows. When hydrology is analyzed, water years are designated by DWR as "wet" (W), "above normal" (AN), "below normal" (BN), "dry" (D), or "critical" (C). All other factors (such as upstream level of development) being equal, much less water will flow into the Delta during a dry or critical water year (that is, during a drought) than during a wet or above-normal water year. Fluctuations in inflows are a substantial overall concern for the Delta, and a specific concern for the SWP; such fluctuations affect Delta water quality and fish habitat, which in turn trigger regulatory requirements that constrain SWP Delta pumping.

Delta inflows will also vary by time of year as the amount of precipitation varies by season. About 80% of annual precipitation occurs between November and March, and very little rain typically falls from June through September. Upstream reservoirs regulate this variability by reducing flood flows during the rainy season, and storing water to be released later in the year to meet water demands and flow and water quality requirements."

Water Quality Objectives

"Because the Delta is an estuary, salinity is a particular concern. In the 1995 WQCP, the State Water Board set water quality objectives to protect beneficial uses of water in the Delta and Suisun Bay. The objectives must be met by the SWP (and federal CVP), as specified in the water right permits issued to DWR (and the U.S. Bureau of Reclamation). Those objectives—minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity levels—are enforced through the provisions of the State Water Board's Water Right Decision 1641 (D-1641), issued in December 1999 and updated in March 2000.

DWR and Reclamation must monitor the effects of diversions and SWP and CVP operations to ensure compliance with existing water quality standards.

Among the objectives established in the 1995 WQCP and D-1641 are the "X2" objectives. X2 is defined as the distance in kilometers from Golden Gate where salinity concentration in the Delta is 2 parts per thousand. The location of X2 is used as a surrogate measure of Delta ecosystem health.

D-1641 mandates the X2 objectives so that the State Water Board can regulate the location of the Delta estuary's salinity gradient during the 5-month period of February–June.

For the X2 objective to be achieved, the X2 position must remain downstream of Collinsville in the Delta for the entire 5-month period, and downstream of other specific locations in the Delta on a certain number of days each month from February through June. This means that Delta outflow must be at certain specified levels at certain times, which can limit the amount of water the SWP may pump at those times at its Harvey O. Banks Pumping Plant in the Delta.

Because of the relationship between seawater intrusion and interior Delta water quality, meeting the X2 objective also improves water quality at Delta drinking water intakes; however, meeting the X2 objectives can require a relatively large volume of water for outflow during dry months that follow months with large storms.

The 1995 WQCP and D-1641 also established an export/inflow (E/I) ratio. The E/I ratio is designed to provide protection for the fish and wildlife beneficial uses in the Bay Delta estuary. The E/I ratio limits the fraction of Delta inflows that are exported. When other restrictions are not controlling, Delta exports are limited to 35% of total Delta inflow from February through June and 65% of inflow from July through January."

Section VI: Climate Change

Within the five year horizon of this Plan, the District is much more concerned regarding the current reliability (or lack thereof) of the SWP than it is about climate change. However, the potential effects of climate change, which DWR projects to impact both the District's local area and result in statewide changes that could affect the SWP and its water supplies in the longer term, are a substantial concern beyond the planning horizon of this Plan.

DWR estimates indicate that by 2050 the Sierra Nevada snowpack, which provides 65 percent of California's water supply, will be significantly reduced. Much of the precipitation is expected to fall as rain instead of snow during winter and cannot be stored in our current water systems for later use. The climate is also expected to become more variable and extreme, bringing more droughts and floods. Thus the District will need to be prepared to adapt to greater variability in weather patterns.

Potential Climate Change Effects
Within the next 20 years, DWR expects that water supplies, water demand, sea level, and the occurrence and increased severity of floods will be affected by climate change. Some of these potential changes are presented below. The District will need to consider these climate change effects, many of which are already documented in California, and reviewed in the latest State Water Project Delivery Capability Report prepared by DWR.

1. Water Demand — Shorter winters, more hot days and nights, and a longer irrigation season will increase water demand in the District and increase competition for water by others.
2. Water Supply and Quality — Reduced snowpack, shifting spring runoff to earlier in the year, has the potential to impact water supply and quality.
3. Sea Level Rise — The Delta, which is the current route the District's SWP water takes on its way southward in the Aqueduct to the District, will be at greater risk to increased salinity due to sea level rise. It is expected that sea level will continue to rise due to the warming of the oceans. This will result in more extreme tides affecting Delta levee stability in low-lying areas and increase flooding.
4. Disaster — Disasters are predicted to become more frequent as climate change brings increased climate variability, resulting in more extreme droughts and floods.

Specific Points to Consider
Thus out of prudence, as the District continues to address near-term periods of water deficiency from the SWP during this planning cycle, it also must factor the following climate change impacts projected by DWR in its longer term plans and work with DWR and SWC in planning for:

1. Irrigation demand increasing as temperatures rise and rainfall becomes more variable.

2. Permanent crops, which make up the majority in the District, being adversely affected by climate change, are more difficult to shift to alternative crops, causing reduced flexibility for adapting to changing climatic conditions.
3. Expecting flooding risk to increase as a result of more severe rainfall patterns and warmer winter rains. This could affect water supply and conveyance of State and local water distribution facilities.
4. Snowpack significantly diminishing as the climate warms. Diminished snowfall in the mountains and earlier runoff will result in reduced SWP water supply and other sources derived from Sierra Nevada snowpack.
5. Vulnerability of the Sacramento-San Joaquin River Delta to impacts of climate change, most notably sea level rise. Higher sea levels will make it more difficult to export water from the Delta with the existing infrastructure which may result in reduced water deliveries over time.

Section VII: Water Use Efficiency Information

A. EWMP Implementation and Reporting

Critical EWMP 1 – Water Measurement

Due to the small number of water users in the District (typically five) and negligible losses in the District's distribution system (estimated to be <0.5%), virtually all water delivered to the District from SWP turnouts is delivered to water users at individual farm turnouts. Minor losses (evaporation, weeping at construction joints, etc.) are charged on a pro rata basis to downstream users so that all water diverted from the Aqueduct is charged to the water users.

DWR calibrates the meters at the SWP turnouts on a regular basis; the Parshall flumes and Venturi tube meters at these locations are considered to be within the accuracy of 2% - 5%. District flowmeter readings are compared monthly to DWR readings and daily against water user orders. District flowmeters are calibrated when damaged meters are repaired or on-going discrepancies with DWR readings are recorded. This procedure provides satisfactory assurances that water is accurately accounted for from the Aqueduct to the water user.

The District considers that it has adequately implemented this EWMP.

Critical EWMP 2 – Volume Based Pricing

As previously discussed, the District's pricing structure is partially fixed and partially volumetric. SWP fixed costs are charged on a water allotment (Table A) basis, while variable costs are based on volumetric deliveries to each water user. This methodology mirrors the payment structure which DWR uses to charge its contractors. Full (unsubsidized) costs for constructing, maintaining, and operating the SWP are recovered by DWR by charges to all SWP contractors.

With the Monterey Amendment in 1995, an agricultural rate management fund was established to convert the relatively high SWP fixed costs, which are charged on a Table A basis, into more of a volumetric charge. A portion of agricultural contractors' payments is held in a trust account in years of full SWP deliveries; those funds may be used by a SWP ag contractor to pay fixed costs for the portion of water that is unavailable in years when Table A shortages are experienced. As an example, if the water supply allocation in a year is 60 percent of Table A, then the trust fund would pay the fixed costs for 40 percent of Table A (that portion not available for delivery) to the extent that the contractor has previously accumulated a sufficient amount in the trust account. Up until 2002, the trust fund had reduced the fluctuations in the unit cost ($/AF delivered) associated with the SWP fixed costs and via the agricultural repayment system, converted SWP costs to more of a volumetric charge for both fixed and variable costs. In 2002, the trust fund balance was liquidated to offset the 65% Table A allocation, and since then, the trust fund withdrawals account for an offset of less than ten percent of the DWR charges.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 1 – Facilitate Alternative Land Uses

The District has no lands with exceptionally high shallow water levels or whose irrigation contributes to on-farm or recognized downstream drainage issues.

No action on this EWMP is required.

Conditional EWMP 2 – Facilitate Use of Recycled Water

The Kettleman City wastewater treatment plant is located near the northern tip of the District. The effluent from the plant is reclaimed and already contracted for use by agricultural lands located outside the District. The District has no urban water uses within its boundaries; therefore, no recycled urban wastewater is available.

No action on this EWMP is required.

Conditional EWMP 3 – Facilitate Financing of Capital Improvements for On-Farm Irrigation Systems

The District has in the past, and will continue to pursue project financing for District projects that have landowner support. District management is knowledgeable with funding sources available to public agencies and structuring improvement districts, as evidenced by its distribution system improvements, most of which were financed by two DWR administered low-interest loan programs.

On-farm improvements have been financed in the past by landowners by their own means or private lending institutions. The on-farm irrigation systems are all low-volume drip/micro-sprinkler systems that are highly efficient. As future opportunities arise, District management can be expected to inform landowners of state and/or federal programs that could assist local growers with financing on-farm irrigation systems.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 4 – Implement an Incentive Pricing Structure

As previously discussed, the District's pricing structure is partially fixed and partially volumetric. SWP fixed costs are charged on a water contract amounts (Table A) basis, while variable costs are based on volumetric deliveries. This methodology mirrors the payment structure which DWR uses to charge its contractors. Full (unsubsidized) costs for constructing, maintaining, and operating the SWP are recovered by DWR by charges to all SWP contractors.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 5 – Line or Pipe Ditches and Canals

All District-owned conveyance facilities are concrete-lined canals or piped.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 6 – Increase Flexibility in Water Ordering and Deliveries

The District's water delivery system is classified as a fixed duration-restricted arranged demand system with deliveries arranged in advance and a normal duration in 24-hour time intervals. By contract with DWR and under the District's Operating Rules and Regulations (Exhibit 6), daily water requests for a continuous and constant rate are to be made at least 24 hours in advance, with adjustments made at 9:00 a.m. each day. In practice, the District and DWR attempt to accommodate adjusting water deliveries on a day-to-day basis and since 2003, DWR has allowed mid-day delivery reductions to minimize electrical use during peak periods.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 7 – Construct and Operate Spill and Tailwater Recovery Systems

Operational spills rarely occur in the District and if spills occur, the water is generally recoverable by a downstream user. Pump failure, power outages or damaged distribution facilities are potential causes for operational spills. However, should a spill occur, the responsible party (generally the water user who had ordered the water) is charged for the water spilled. This provides an on-going incentive to avoid and rapidly report operational spills.

Landowners are required by the District to maintain applied water on their lands—privately operated tailwater/spill recovery systems are in place to accomplish this element of water management, although these needs are minimized by the use of low-volume drip and micro-sprinkler systems on all irrigated lands.

The District has no discharge to any dry streams, which are contained to reduce flooding across farmlands. Flood flows do not flow to rivers, but to re-regulation areas where they are used for subsequent irrigation.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 8 – Optimize Conjunctive Use of Surface and Groundwater

No opportunities exist for groundwater recharge and conjunctive use within the District. However, the District is a participant in the Kern Water Bank, has a long-term agreement for in-lieu water banking with the Cawelo Water District, has a water banking agreement with Semitropic Water Storage District, and has an exchange agreement through 2020 with the San Gabriel Valley Municipal Water District. Additionally, the District has a long-term water exchange program with Kern County Water Agency that can be used for other conjunctive use opportunities.

The District relies on transfers and exchanges with these water entities to provide additional flexibility to optimize beneficial use of the water supplies and storage facilities available to the District.

No action on this EWMP is required.

Conditional EWMP 9 – Automate Canal Structures

District and on-farm canal systems experience minimal fluctuations in flow, primarily due to the uniformity of the Aqueduct deliveries provided by DWR. As only one of the five District turnouts is shared among more than one water user, the opportunities for automation are limited.

No action on this EWMP is required.

Conditional EWMP 10 – Facilitate Customer Pump Testing and Evaluation

As previously discussed, there are no agricultural water users in the District that have groundwater pumps that would require testing.

No action on this EWMP is required.

Conditional EWMP 11 – Designate a Water Conservation Coordinator

The District has designated Rick Besecker as water conservation coordinator.

Rick Besecker
Dudley Ridge Water District (559) 449-2700 (office)
286 W. Cromwell Ave. (559) 449-2715 (fax)
Fresno, CA 93711-6162 rbesecker@ppeng.com (email)

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 12 – Support Availability of Water Management Services to Water Users

The District staff have assisted water users with the development of water banking programs; exchange and transfer programs; dry year water purchase programs; the evaluation and facilitation of the construction of new turnouts, concrete-lined canals, and replacement of earthen canals with pipelines; and automated trash racks and provided chemical treatments for more efficient water deliveries. Staff remains available to investigate additional programs as they arise.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 13 – Evaluate the Need for Changes in Policies

The most significant institution to which the District is subject to outside policies is DWR. The relationship between District staff and DWR staff has always been good. Nevertheless, policy differences arise with respect to water supply and operations of the SWP. Generally, as policy issues arise they are discussed either directly with DWR or among the SWC. Once agreement is reached by the SWC board (usually with input from DWR), then DWR management is requested to consider changes in the subject policies.

DWR and SWC policies and issues are reviewed regularly, generally on a case-by-case basis, or via committees with SWC and DWR representation.

During negotiations for what became the Monterey Agreement, a number of policy issues related to the SWC's water service contracts with DWR were reviewed. These included funding mechanisms for development of new SWP facilities as they relate to DWR's funding sources, groundwater storage outside a contractor's service area, reservoir storage flexibility, transport of market water, and other policy issues related to water management, allocations, and financing. The resolution of these policy issues has resulted in improved water management throughout the service areas of those SWP contractors that ultimately signed the Monterey Amendment, however, litigation related to CEQA is on-going which could potentially affect the long-term implementation of this amendment, including the District's participation in the Kern Water Bank.

The District and other SWP contractors have and will continue to work with DWR to develop a more efficient process for approving water transfers and exchanges among SWP contractors. It is generally accepted that improvements can be made, particularly related to routine operational transfers (i.e., to/from established banking programs, common landowner transfers, and similar routine transfers/exchanges); the District is optimistic that DWR's approval process will be improved, hopefully for streamlining water transfer programs and providing additional water management tools in the near future. Part of the District's effort to assist DWR in their approval process has been to subject the District's AWMP to CEQA review of the District's water management strategies, including the historical and future water transfer and exchange practices discussed herein.

The District considers the existing arrangement for resolution of policy issues to be generally successful. DWR and SWC policies are debated and resolved as they arise, leading to a workable resolution process.

The District considers that it has adequately implemented this EWMP.

Conditional EWMP 14 – Evaluate and Improve Pump Efficiencies

The District does not own or operate groundwater or lift pumps; all of the District's supply turnouts are gravity fed from the Aqueduct.

No action on this EWMP is required.

Other EWMP 1 – Improve Communication and Cooperation Among Water Suppliers, Users, and Other Agencies

The District holds scheduled publicly-noticed monthly Board meetings where the management, Board, interested landowners and water users, and other interested parties communicate and the Board takes actions on relevant water and financial issues of the District. Additionally, District representatives are active participants in the State Water Contractors, Inc. (a non-profit organization of SWP contractors) and the State Water Project Contractors Authority (a joint powers authority consisting of most of the

SWP contractors). The District is also a member of the Association of California Water Agencies, Joint Powers Insurance Authority, Agricultural Energy Consumers Association, Kings County Water Commission, Committee for a Reliable Delta, Valley Ag Water Coallition, San Joaquin Valley Agricultural Water Committee, Water Education Foundation, California Farm Water Coalition, and Underground Service Alert. Participation in these organizations provides District management with opportunities to communicate and cooperate with other water suppliers and public agencies.

Additionally, because the District has a relatively small number of water users, the use of a telephone-, fax-, and email-tree system has proven to be effective for disseminating timely information among the water users.

The District considers that it has adequately implemented this EWMP.

Other EWMP 2 – Facilitate Voluntary Water Transfers

Rule 6 of the District's Operating Rules and Regulations (Exhibit 6) describes the District's water transfer policies (further detailed in Exhibit 7 and Exhibit 8). Generally, the District allows transfers in this order of priority:

1. Internal transfers between landowners shall be allowed to meet in-District demands, providing that the transfers do not conflict with the District's Rules and Regulations and District policies.
2. Landowners may transfer water to a District-approved banking or exchange program.
3. Transfers of water to outside of the District shall be approved on a case-by-case basis; such approvals shall not be unreasonably withheld. The water must be transferred to the same landowner's or water user's lands outside the District where substantially the same landowner or water user business affiliation exists as exists within the District.
4. In the case of an annual transfer (sale or exchange) to an unrelated party outside of the District, other District landowners shall have the option of "right of first refusal" to the water made available at the same terms and conditions offered to the unrelated party.

The District relies on transfers and exchanges with other water entities to provide the necessary flexibility to optimize beneficial use of the water supplies and storage facilities available to the District.

The District considers that it has adequately implemented this EWMP.

Section VIII: Supporting Documentation

Agricultural Water Measurement Regulation Documentation (as applicable)

The District takes its water deliveries through five metered turnouts off of the California Aqueduct. Turnouts DR1, DR1-A and DR1-B each serve an individual customer, and are the points where control of the water is turned over from the District to the water user (known as the "farm-gate"). Turnouts DR2 and DR3 can each serve multiple customers and the points where control of the water is turned over to the water user are discussed below. All water deliveries are scheduled in advance with the District, both duration and flow rate.

A. Legal Certification and Apportionment Required for Water Measurement—Lack of Legal Access to Farm-gate

Not applicable—the District has legal access to measure water at the farm-gate.

B. Engineer Certification and Apportionment Required for Water Measurement—Technically Infeasible

Not applicable—the District measures water at the farm-gate.

C. Description of Water Measurement Best Professional Practices

Collection of Water Measurement Data
The District takes its water deliveries through five metered turnouts off of the California Aqueduct. Turnouts DR1, DR1-A and DR1-B have totalizing Venturi meters and each turnout serves an individual customer. DR2 and DR3 are metered utilizing Parshall flumes and each turnout can serve multiple customers. These meters record instantaneous flow rates as well as total quantities delivered. Measurements for each of these deliveries are described below.

Turnouts DR1/DR1-A/DR1-B
Water deliveries through turnouts DR1, DR1-A and DR1-B are made directly to individual customers and are recorded daily by DWR. After the end of each month the daily totals are compared with beginning and end of month totalizer readings.

Turnout DR2
Gross water deliveries through turnout DR2 are recorded daily by DWR, and then distributed from a distribution box to four separate conveyance pipelines for delivery as needed to three canals and two pump stations. Deliveries to individual customers are measured as follows:

1. Canal 2-E—a slide gate at the distribution box regulates the amount of water that is conveyed via pipeline to the head end of a canal serving an individual customer. A propeller meter is utilized to confirm discharge rates into the canal.

2. Pump Station—a slide gate at the distribution box regulates the amount of water that is conveyed via pipeline directly to the intake of a metered pump station serving an individual customer. A propeller meter is utilized to confirm discharge rates to the pump station.
3. Canal 2-E1—an ungated pipeline conveys water to a separate distribution box (downstream of the main distribution box) which contains the intake to a metered pump station serving an individual customer. In addition, a slide gate at the downstream distribution box regulates the amount of water that is conveyed via pipeline to the head end of a canal serving an individual customer. A propeller meter is utilized to confirm discharge rates into the canal.
4. Canal 2-S—a slide gate downstream of the distribution box regulates the amount of water that is conveyed via pipeline to the head end of a canal that serves an individual customer. Discharge rates into the canal are calculated by taking the turnout's instantaneous flow rate from DWR's Parshall flume and subtracting the metered canal and pump station readings.

Turnout DR3

Gross water deliveries through turnout DR3 are recorded daily by DWR, and although most of the time deliveries are made to a single customer, water can be diverted to two customers via Canal 3-S. Deliveries to individual customers are measured as follows:

1. Canal 3-S with one customer—gross deliveries through turnout DR3 are recorded daily by DWR. After the end of each month, the daily totals are compared with beginning and end of month totalizer readings.
2. Canal 3-S with two customers—a slide gate on Canal 3-S located downstream of turnout DR3 regulates the amount of water that is conveyed to a lateral serving an individual customer. A permanently installed calibrated staff gauge is utilized to confirm discharge rates into the lateral which is used infrequently; the difference between this flow rate and DWR's metered rate is allocated to the other landowner.

Frequency of Measurements

DWR continuously measures water delivered through each of the five turnouts off of the Aqueduct. District staff measures water delivered to individual customers from Turnouts DR2 and DR3 daily when setting the gates.

Method for Determining Irrigated Acres

The District is planted primarily to permanent crops, and as such, irrigated acreage remains relatively consistent. The District annually collects crop data from the landowners and makes adjustments to the irrigated acreage as needed.

Quality Control and Quality Assurance Procedures

Turnouts DR1, DR1-A, and DR1-B are measured with Venturi meters. Pressure differential across the Venturi is measured with a pressure differential transmitter in inches of water and is converted to a 4-20 ma signal sent to a flow recorder. The accumulative flow from the recorder is retrieved and downloaded by DWR once

monthly. At the end of the month the recorder data is downloaded and analyzed and volume is deducted for meter discrepancies or creep. Regular site visits occur twice a week to verify the meters are operating correctly and monthly to perform meter calibrations and routine maintenance. Routine maintenance consists of clearing Venturi lines and flushing the Venturi piping of silt and air for proper flow calculation.

Turnouts DR2 and DR3 are measured with twelve-foot Parshall flumes. Flow is calculated by measuring the depth of the water in feet and tenths of feet from the stilling well with an acoustic water level probe. The depth reading is then converted to a 4-20 ma signal and sent to a flow recorder. The accumulative flow from the recorder is retrieved and downloaded by DWR once monthly. At the end of the month the recorder data is analyzed and volume is deducted for meter discrepancies or creep. Routine maintenance of the Parshall flume consists of weekly cleaning of algae from the flume floor and removing silt from the stilling wells. Calibration of the water level measuring devices and flume staff gage occurs once a year.

The District's propeller meters are spot checked daily when setting the gates—the sum of the combined readings are compared with DWR's measured reading, and if there are discrepancies, the faulty meter is sent in for repair.

Records of Aqueduct turnout meter readings, recorder data, meter maintenance and calibrations, and deliveries reports are retained at DWR's operations office and archived to storage after 5 years.

D. Documentation of Water Measurement Conversion to Volume

Turnouts DR1, DR1-A and DR1-B have totalizing Venturi meters and each turnout serves an individual customer. Flow rates are measured to each customer at turnouts DR2 and DR3 and because they remain constant over a fixed duration, can be converted to daily volume.

E. Device Corrective Action Plan Required for Water Measurement

The propeller meters are sent in for repairs as required, and are calibrated after they are rebuilt. Because there is a mechanical linkage between the propeller and the instantaneous readout/totalizer that tends to wear out prematurely, the District has decided to modify the meters in 2013 by replacing the mechanical linkage with an electronic upgrade. The cost was collected from each of the Service Areas through the maintenance portion of the District's Standby Charge.

Exhibit 1. Public Notifications.

400.223

DUDLEY RIDGE WATER DISTRICT

DIRECTORS
JOSEPH C. MacILVAINE, PRESIDENT
LARRY RITCHIE, VICE PRESIDENT
STEVEN D. JACKSON, SECRETARY
JOHN VIDOVICH
BERNARD PUGET

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MANAGER-ENGINEER
DALE K. MELVILLE
ASSESSOR-COLLECTOR-TREASURER
RICK BESECKER
LEGAL COUNSEL
GARY W. SAWYERS

December 4, 2015

Corcoran Journal
PO Box 487
Corcoran CA 93212

VIA EMAIL

Gentlemen,

Enclosed please find "Notice of Preparation" by the Dudley Ridge Water District to be published in the Corcoran Journal **weekly for two consecutive weeks, on December 10, 2015 and December 17, 2015**

Please send the billing and Affidavit of Publication to the above address.

Thank you,

Rick Besecker
Assessor-Collector-Treasurer

Enclosure

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NOTICE OF PREPARATION

DUDLEY RIDGE WATER DISTRICT

2015 AGRICULTURAL WATER MANAGEMENT PLAN

NOTICE is hereby given that Dudley Ridge Water District prepared a draft of its 2015 Agricultural Water Management Plan. Any person wishing to review a copy of the plan may telephone the office of the District at (559) 449-2700 and ask for Rick Besecker, Water Conservation Coordinator.

In addition, the District will be holding a public meeting to review and adopt the Plan on January 13, 2016 at 2:00 p.m. at the District office.

Rick Besecker

Rick Besecker, Water Conservation Coordinator
Dudley Ridge Water District

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** Transmit Confirmation Report **

P.1
PROVOST & PRITCHARD Fax:559-326-1090

Dec 4 2015 12:58pm

Name/Fax No.	Mode	Start	Time	Page	Result	Note
Kings Co Water Commision	Normal	04,12:53pm	0'27"	1	# 0 K	BrdCast
Kettleman City CSD	Normal	04,12:54pm	1'03"	1	# 0 K	BrdCast
Green Valley WD	Normal	04,12:55pm	0'44"	0	T.1.1	BrdCast
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Tulare Lake Basin WSD	Normal	04,12:56pm	0'34"	1	# 0 K	BrdCast
Kern County WA	Normal	04,12:57pm	0'51"	1	* 0 K	BrdCast

DUDLEY RIDGE WATER DISTRICT

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MANAGER-SECRETARY
DALE K. MELVILLE
ASSISTANT SECRETARY-TREASURER
RICK BESECKER
LEGAL COUNSEL
GARY W. SAWYERS

December 4, 2015

To: Kings County Water Commission/ VIA Fax (559) 584-8989
Planning Department/LAFCO
1400 W. Lacey Blvd.
Hanford, CA 93230

Kettleman City Community Services District VIA Fax (559)-386-9202
110 General Petroleum Ave
Kettleman City, CA 93239

Green Valley Water District VIA Fax (408) 738-0231
c/o DeAnza Properties
960 N San Antonio Rd Ste 114
Los Altos CA 94022

Tulare Lake Basin Water Storage District VIA Fax (559) 992-3891
1001 Chase Ave
Corcoran, CA 93212

Kern County Water Agency VIA Fax (661) 634-1428
3200 Rio Mirada Dr
Bakersfield, CA 93302

Subject: Notice of Preparation of the Dudley Ridge Water District 2015 Agricultural Water Management Plan

Gentlemen:

Please be advised that the Dudley Ridge Water District has prepared a draft of its 2015 Agricultural Water Management Plan. Any person wishing to review a copy of the plan may telephone the office of the District at (559) 449-2700 and ask for Rick Besecker, Water Conservation Coordinator.

In addition, the District will be holding a public meeting to review and address the plan on January 13, 2016 at 2:00 p.m. at the District office.

Respectfully,

Rick Besecker

Rick Besecker
Water Conservation Coordinator

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** Transmit Confirmation Report **

P.1 Dec 4 2015 01:10pm
PROVOST & PRITCHARD Fax:559-326-1090

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Green Valley WD	Normal	04,01:10pm	0'30"	1	# 0 K	

DUDLEY RIDGE WATER DISTRICT

286 W. CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162

PHONE (559) 449-2700
FAX (559) 449-2715

December 4, 2015

To: Kings County Water Commission/ Planning Department/LAFCO
1400 W. Lacey Blvd.
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110 General Petroleum Ave
Kettleman City, CA 93239
VIA Fax (559)-386-9202

Green Valley Water District
c/o DeAnza Properties
960 N San Antonio Rd Ste 114
Los Altos CA 94022
VIA Fax ~~(408) 738-0231~~ 650 209 3244

Tulare Lake Basin Water Storage District
1001 Chase Ave
Corcoran, CA 93212
VIA Fax (559) 992-3891

Kern County Water Agency
3200 Rio Mirada Dr
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Respectfully,

Rick Besecker

Rick Besecker
Water Conservation Coordinator

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DRWD 100.031 (2015)

AFFIDAVIT OF POSTING NOTICES

I, Juan Barraza, deposes and says:

that I am a citizen of the United States and reside at 13654 Hwy 33, Lost Hills, California; that I am over the age of twenty-one years; and that on the 4 day of December, 2015 I posted the following Notice of Preparation at five conspicuous locations (turn outs 1, 1A, 1B, 2 and 3) within the Dudley Ridge Water District:

Juan Barraza

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AFFIDAVIT OF POSTING NOTICES

I, Rick Besecker, deposes and says:

that I am a citizen of the United States and reside at 2154 E. Trenton Ave, Fresno, California; that I am over the age of twenty-one years; and that on the 4th day of December 2015 I posted the following Notice of Preparation at the District office of the Dudley Ridge Water District.

Rick Besecker

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Exhibit 2. Resolution of Plan Adoption.

RESOLUTION NO. 2016-02

RESOLUTION OF THE BOARD OF DIRECTORS OF DUDLEY RIDGE WATER DISTRICT REGARDING ADOPTION OF THE 2015 UPDATE OF THE 2012 AGRICULTURAL WATER MANAGEMENT PLAN

WHEREAS, an Agricultural Water Management Plan for the District ("Plan") has been developed to comply with the requirements of Senate Bill SB X7-7-Water Conservation Act (Steinberg Statute of 2009), (Section 1, Part 2055, Division 6 of the California Water Code), the associated Agricultural Water Management Planning Act (Section 1, Part 2.8, Division 6 of the Water Code), and the subsequent Agricultural Water Measurement Regulation requirements (described in Title 23 California Code of Regulations); and

WHEREAS, this Board fixed January 13, 2016, at the hour of 2:00 P.M., at the District Office, 286 West Cromwell Avenue, Fresno, California, as the time and place where the public was invited to review and discuss the Plan; and

WHEREAS, the Secretary of this Board caused publication of notice of preparation of the Plan and of the time and place of said public meeting in the Corcoran Journal, a newspaper of general circulation published in the County of Kings, State of California, posted such notice in the District Office, and faxed such notice to various local government agencies; and

WHEREAS, this Board met as scheduled on January 13, 2016, at 2:00 P.M. to receive public comments on the Plan; and

WHEREAS, no public comments on the Plan were provided; and

WHEREAS, the Board has reviewed the Plan and considers its adoption to be in the best interest of the District and its landowners.

NOW, THEREFORE, BE IT RESOLVED, that this District adopts the 2015 Update to the 2012 Agricultural Water Management Plan and directs its President and/or Manager to submit the Plan to the Department of Water Resources and other interested parties as described in the Plan.

PASSED AND ADOPTED this 13th day of January, 2016.

CERTIFICATE OF SECRETARY

The undersigned hereby certifies that I am the Secretary of Dudley Ridge Water District and that the foregoing Resolution was authorized by the Board of Directors of said District at a meeting thereof, duly and regularly held on January 13, 2016, at which meeting a quorum of the Board of Directors was at all times present and acting.

IN WITNESS THEREOF, I have set my hand this 13th day of January, 2016.

(DISTRICT SEAL)

Steven D. Jackson, Secretary
Dudley Ridge Water District

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Exhibit 3. District Location Map.

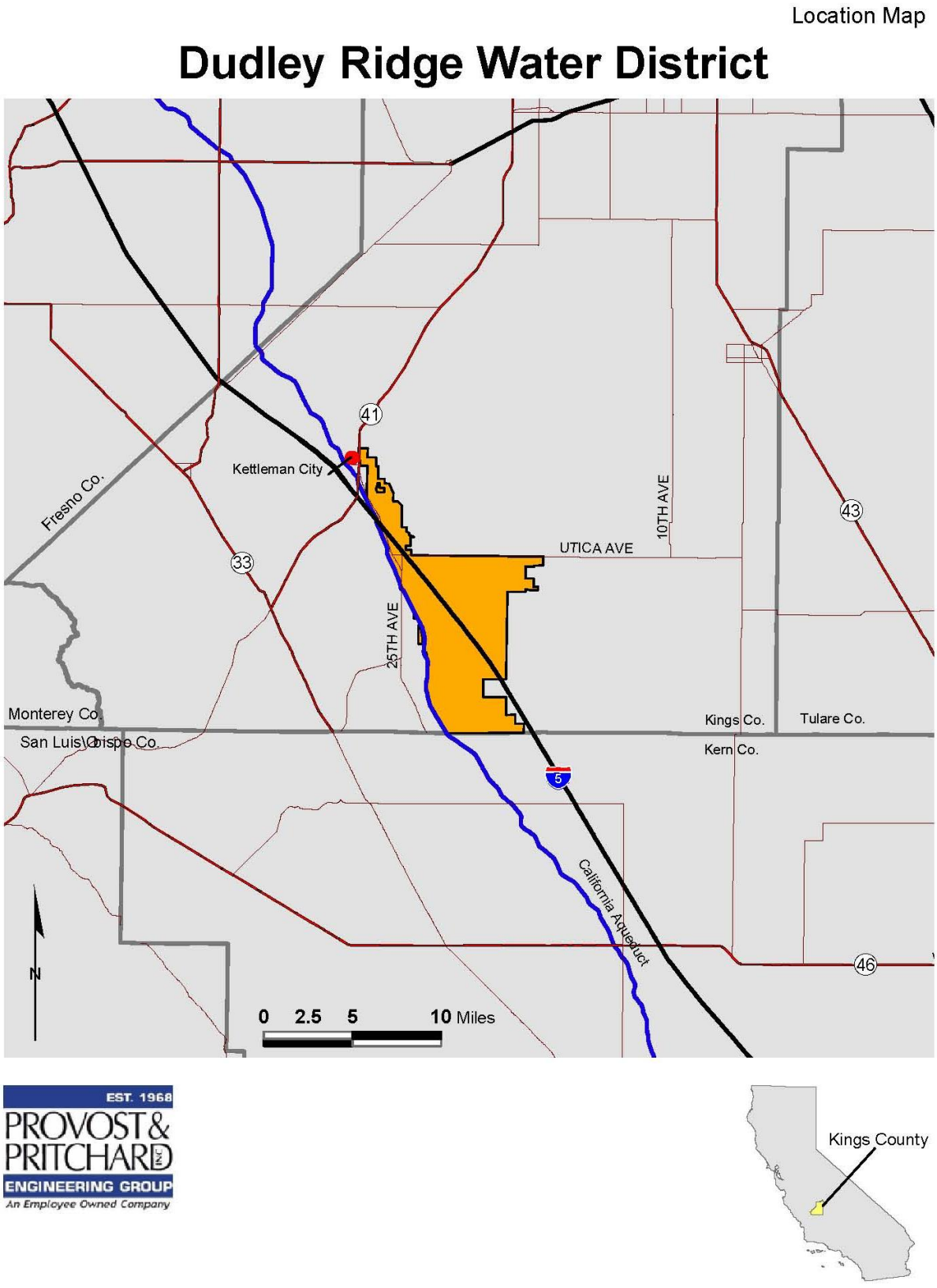

Exhibit 4. District Distribution System Map.

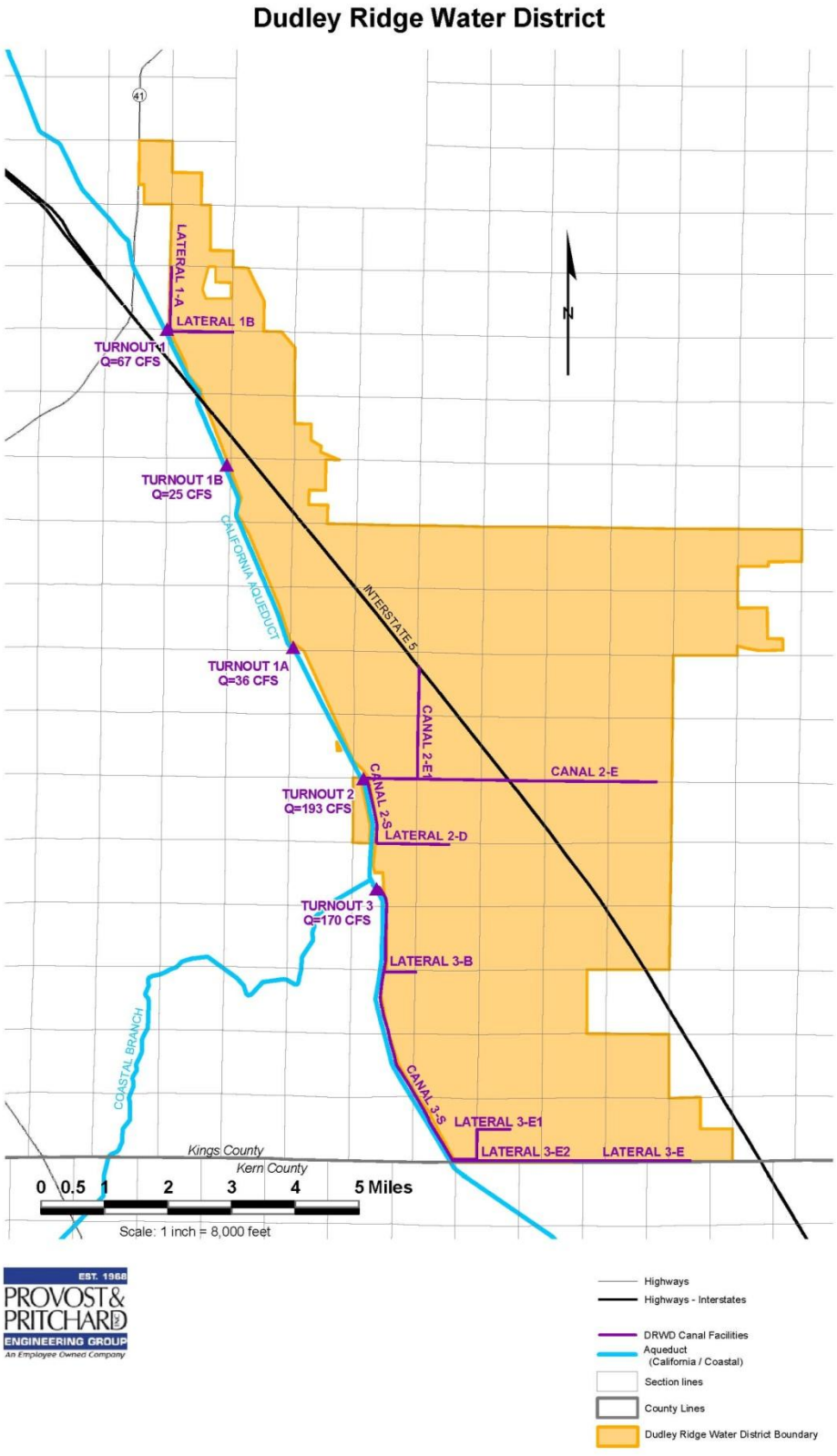

Exhibit 5. District Soils Map.

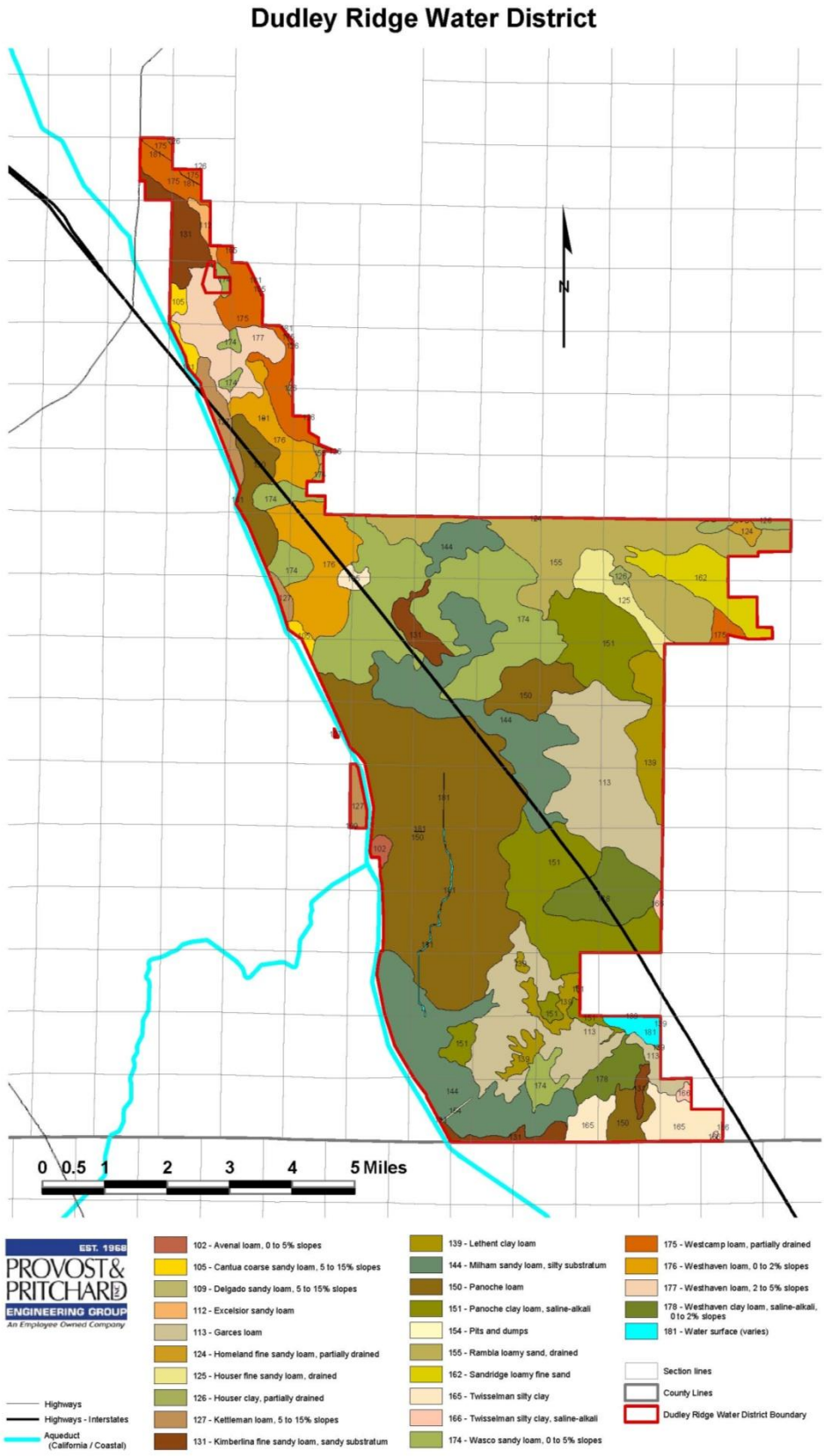

Exhibit 6. District Operating Rules and Regulations.

RULES AND REGULATIONS
Governing the Use, Distribution,
and Charges for Water Service in
Dudley Ridge Water District

Adopted by the Board of Directors
December 8, 2010

RULES AND REGULATIONS
Governing the Use, Distribution,
and Charges for Water Service in
Dudley Ridge Water District

These Rules and Regulations are adopted pursuant to Section 35423 of the Water Code of the State of California, are intended to assist the Board of Directors in providing economic management to effect orderly, efficient, and equitable distribution and use of water within the District, and may be amended or repealed at any regular meeting of the Board of Directors or at any special meeting called for that purpose.

The Board of Directors requests cooperation of all landowners and water users in compliance with these Rules and Regulations to permit water to be distributed in an orderly manner, so that water users can be served with some regularity and receive equivalent benefits from water service.

As used in these Rules and Regulations, the following terms have the meanings set forth:

District's Water Service Area: Those parcels of land within the District which have an allocation for State Water Project ("SWP") Table "A" water for which water from the District has been requested and approved at any time. Land for which a water allocation has been requested and approved in any previous year will be considered inside the District's Water Service Area even if no water has been requested or applied for with respect to that land for the current year. Subordinately annexed lands are excluded from the District's Water Service Area, except subordinately annexed lands which, by virtue of a contract with the District, receive an annual allocation for SWP Table "A" water as the result of an approved transfer.

Table "A" Contract Water: The water provided to the District pursuant to the District's Water Supply Contract with the State of California Department of Water Resources ("DWR") which is allocated to the District and identified on Table "A" of such Water Supply Contract.

Landowner: Any individual or legal entity owning real property within the District.

Water User: Any individual or entity eligible for and properly requesting or applying for water from the, whether or not such individual or entity is a landowner.

SWP Fixed Costs: All State Water Project annual costs imposed on the District by the DWR related to the Districts' Table "A" Contract Water, excluding charges associated with water delivery quantities (i.e., Variable OMP&R and Off-Aqueduct charges) and excluding credits derived from the Agricultural Rate Management Trust Fund.

Rule 1. CONTROL OF DISTRICT FACILITIES

The operation and maintenance of the facilities of the District shall be under the exclusive management and control of the Board of Directors, the Manager, or a duly appointed representative. The District shall have control of all diverting gates, pumps, weirs, and private ditches up to and including the point of measurement, to such extent as may be necessary to regulate and measure the flow of water, but the District shall not assume or incur any liability for the maintenance or repair or privately owned gates, pumps, weirs, or other appurtenances. No unauthorized person(s) shall interfere with District facilities in any manner, including, but not limited to, the opening, closing, or regulating of any of the District's valves, gates, or turnouts unless so directed by the Board of Directors or the Manager.

Any damage to District facilities or property resulting from such unauthorized action by the water users shall be the responsibility of the water user or landowner making such use of the property or facilities. If satisfactory repairs are not made promptly by the responsible individuals, the District will make the necessary repairs and appropriately charge the responsible individual.

An emergency condition exists when there is risk of damage to the District's distribution system, life, or property. The District reserves the right to terminate water service to any water user during an emergency condition.

Rule 2. USE OF DISTRICT FACILITIES

The District owns, operates, and maintains service roads along its canals for access to canal check gates, distribution laterals, and mainline valves. These roads shall not be used by anything but pickup trucks and automotive-type traffic. Landowners and water users are requested to refrain from using the service roads during rainy periods when traffic may make the road impassable or damage the roads. In addition to the canal service roads, the District has obtained a right-of-way (easement) for access along each of the District's pipelines and distribution laterals. Access to District facilities on pipelines and laterals is essential. All rights-of-way along District pipelines shall be kept open and free of obstructions, fences, or buildings. Water users shall also insure that irrigation water or tailwater is not applied or allowed to collect on the District's access roads or rights-of-way.

It is the responsibility of each water user to prudently manage the water supply received from the District or through District-operated facilities. Water (tailwater, wastewater, drainage, groundwater, and/or filter backwash water) shall be maintained on the water user's lands and not be discharged to the District's rights-of-way or facilities or to another landowner's lands without written authorization from the appropriate party (the District and, if appropriate, the affected landowner(s)). Any and all discharges onto District rights-of-way or facilities must be requested and approved in advance by the District. If the water user requesting the discharge of water to the District's facilities is the only water user downstream of said discharge, it is the

intent of the District to authorize such requests. Authorization may be revoked by the District if the District, other water users, and/or other landowners are determined to be adversely impacted by the discharge.

Water users shall not be allowed to discharge chemicals onto the District's rights-of-way or facilities or onto another landowner's lands. Water users' or landowners' chemical feed systems shall be installed and operated to avoid such discharges.

The facilities of the District distribution system shall not be used for the application of fertilizers, pesticides, or chemicals. All water users shall use utmost caution in applying airborne pesticides and chemicals to lands adjacent to the District's canals to insure that the materials being applied by air do not drift into the canals.

No rubbish, garbage, manure, refuse, waste excavation, or foreign material of any type shall be placed or allowed to be placed in any District canal or along any of the District's rights-of-way.

Failure to comply with this rule shall be sufficient cause for immediate termination of water deliveries until the District is satisfied that adequate measures have been made to remedy the violation. The District's enforcement of this rule and the interruption of water deliveries pursuant hereto shall not result in any liability to the District, its officers, agents, or employees.

Rule 3. ACCESS TO PREMISES OF LANDOWNERS

The authorized agents of the District shall have free access at all times to all lands irrigated from District facilities, and to all canals, laterals, pipelines and ditches, for the purposes of the District.

Rule 4. REQUESTS TO ENTER INTO THE WATER SERVICE AREA

Landowners with lands within the District boundaries, but not currently within the District's Water Service Area, may request to enter into the District's Water Service Area in accordance with the "**Policy for Approving Landowner Requests for Land to Enter the Standby Charge Service Area**" adopted by the Board of Directors on August 13, 1997, or as subsequently amended or restated.

Rule 5. APPLICATIONS FOR WATER

Each acre of land in the District's Water Service Area (excepting those subordinately annexed lands which, by virtue of a contract with the District, receive an annual allocation for SWP Table "A" water as a result of an approved Table "A" transfer) shall be allocated the same quantity of Table "A" Contract Water such that the total is equal to Table "A" Contract Water which is available to the District. Any other water available to the District, including water not needed by water users, shall be offered to the other water users as it becomes available; if requests for such other water exceed the supply for water available, the water shall be

allocated in proportion to the Water Service Area acreage attributed to each requesting water user, up to the water user's request.

If a water user or landowner acquires additional water through temporary or permanent water transfers, above the water otherwise available to the District through its Water Supply Contract, said water user or landowner shall have full use of that water subject to any terms and conditions associated with the additional water.

On or before October 1 of each year, the District shall, on behalf of its landowners and water users, submit in writing to the DWR a preliminary delivery schedule of Table "A" Contract Water based on information available to the District at the time based on the District's full Table "A" amount, previous delivery records, and/or other pertinent information provided by the landowners and water users.

Upon receipt of the District's initial SWP water allocation in December of each year, the District shall notify all water users in the Water Service Area of their initial allocation. Following subsequent changes to the SWP water allocation by the DWR, the District shall notify water users of such updated information. As the annual SWP Table "A" allocation firms up, the District will coordinate with water users to determine the water users' water use plans for the current year relating to (a) scheduling the delivery of the water for use within the District, (b) requesting Supplemental Water that may be available to the District (i.e., SWP Article 21 Water, SWP Turnback Pool Water, Dry Year Water Purchase Programs, and similar), (c) releasing all or a portion of their water for purchase by or transfer to other District water users, and/or (d) requesting a temporary transfer of water in to or out of the District.

If a water user has not informed the District of their intentions as described above or has not scheduled all of their water allocation by April 1, the landowner's water allocation that has not been scheduled for the year ("Unscheduled Water") will be made available for purchase by District water users at the SWP fixed cost (based on the current year's budget and the water allocation at the time of the purchase request) prior to April 20. Landowners whose water has been unscheduled and subsequently purchased by other water users, shall be reimbursed the SWP fixed cost paid by the purchaser(s).

Any Unscheduled Water remaining after April 20 will be made available for purchase by District water users as determined by the Board, which may include implementing options that may be available at the time, including (but not limited to) banking water for use in a future year(s), exchanges with other water districts or water users, and/or making water available at a minimal cost, on a first-come basis, to any District water user that is not delinquent on any District charges. The District shall have no obligation to make any reimbursements to landowners for Unscheduled Water remaining after May 1.

Rule 6. TRANSFERS OF WATER

Temporary Transfers

Internal transfers between landowners shall be allowed to meet in-District demands, providing that the transfers do not conflict with the District's Rules and Regulations and District policies. The District must receive written confirmation of the transfer signed by each affected landowner, and each landowner shall remain responsible for their respective payments of standby charges, improvement district charges, water toll charges, benefit assessments, and other charges levied by the District.

The District allows for temporary transfers of in to and out of the District under the conditions described in the "**Policy for the Temporary Transfer of Water to or from the Dudley Ridge Water District**" adopted by the Board of Directors on December 8, 2010, or as subsequently amended or restated.

In the case of an exchange to an unrelated party outside of the District, District landowners shall have the option of "first right-of-refusal" to the water made available at the same terms and conditions offered to the unrelated party. All District charges associated with the water transferred as part of such an exchange outside the District must be paid prior to District authorization to release the transferred water except if the water is transferred to a District-approved banking or exchange program.

Permanent Transfers

The District allows for permanent transfers of Table "A" amounts to a non-District water purveyor under the conditions described in the "**Policy for the Permanent Transfer of SWP Table "A" Water Outside of Dudley Ridge Water District**" adopted by the Board of Directors on April 8, 2009, or as subsequently amended or restated.

Rule 7. WATER USE PRIORITIES

Water users have the flexibility to use their allocated water supplies for delivery to District lands (including subordinate lands and lands outside the Water Service Area) and/or transfers of water to outside the District (including banking programs, landowner transfers, and exchanges), subject to these Rules and Regulations. Such allocated water supplies may include Table "A" Contract Water, SWP Article 21 water, SWP Turnback Pool water, supplemental water purchase programs such as dry year water purchases, other water supplies made available by the District, or other supplies acquired by a landowner or water user, subject to the terms and restrictions associated with such supplies, if any.

It is the District's intent to maximize the delivery of water that is available to and can be beneficially used by District water users. Accordingly, when SWP Carryover Water is available as of January 1 of any given year, the District will temporarily allocate said Carryover Water, to the extent Carryover Water remains available, to all water users taking delivery of SWP water, whether within the District or delivered via an approved transfer or exchange outside the

District. After all Carryover Water has been used or lost, the District will reallocate an equivalent quantity of the current year's Table "A" Contract Water from water users who were temporarily allocated Carryover Water (from another water user's Carryover Water account) to the Table "A" allocation of the water users whose Carryover Water was used by others.

The reallocation process occurs each month that Carryover Water remains in storage and is detailed as follows:

Step 1. Account for carryover participants' individual Carryover Water use.
At the end of each month, water used directly by the carryover participants is subtracted from their Carryover Water amount at the beginning of that month.

Step 2. Allocate water used by non-carryover participants.
Water used by non-carryover participants is proportionally allocated, up to the carryover participants' remaining carryover amount, by the carryover participants' proportionate share of Table "A" allocation.

Step 3. Reallocate remaining water.
If the reallocated amount exceeds an individual carryover participant's remaining carryover, the amount remaining is reallocated again, up to the remaining carryover participants' carryover amount, by the remaining carryover participants' proportionate share of Table "A" allocation. This process continues until all of the carryover has been delivered, or is displaced in San Luis Reservoir (spills) and is lost.

The following table illustrates the allocation process.

Illustration of Carryover Water Accounting
With Reallocations Based on Table "A" Allocation Percentages

	Water User A	Water User B	Water User C	Other Water Users	Total
Current year allocation, af	21,698	19,785	4,531	4,329	50,343
Percent of Table "A" (among District water users)	43.1	39.3	9.0	8.6	100.0
January					
Step 1. Account for Individual Use.					
Carryover from previous year, af	2,000	1,000	500		3,500
Percent of Table "A" (among carryover participants)	47.2	43.0	9.8		100.0
Water use by carryover participants, af	1,000	0	0		1,000
Water User's remaining carryover, af	1,000	1,000	500		2,500
Step 2. Allocate Use by Non-Carryover Participants.					
Table "A" use by non-carryover participants, af				100	100
Reallocation from non-carryover participants, af	47	43	10	(100)	0
Water User's remaining carryover (subject to spill), af	953	957	490		2,400
Water User's remaining allocation (if carryover spills), af	21,745	19,828	4,541	4,229	50,343
February and Beyond.					
Step 1. Account for Individual Use.					
Carryover from previous month, af	953	957	490		2,400
Percent of Table "A" (among carryover participants)	47.2	43.0	9.8		100.0
Water use by carryover participants, af	0	0	450		450
Water User's remaining carryover, af	953	957	40		1,950
Step 2. Allocate Use by Non-Carryover Participants.					
Percent of Table "A" (among carryover participants)	47.2	43.0	9.8		100.0
Table "A" use by non-carryover participants, af				1,000	1,000
Reallocation from non-carryover participants, af	472	430	98	(1,000)	0
Water User's remaining carryover, af	481	527	(58)		950
Water User's remaining allocation, af	22,217	20,258	4,639	3,229	50,343
Step 3. Reallocate Remaining Water.					
Percent of Table "A" (among carryover participants)	52.3	47.7			100.0
Reallocation from non-carryover participants, af	31	28	(58)		0
Water User's remaining carryover (subject to spill), af	451	499	0		950
Water User's remaining allocation (if carryover spills), af	22,247	20,286	4,581	3,229	50,343

Rule 8. REVISIONS OF WATER SCHEDULE

Revisions in the monthly amounts of water to be delivered to any water user must be submitted to the District on or before the 25th of the month preceding the month in which the water is to be delivered. All such revisions shall be subject to approval of the Manager of the District in accordance with the policies of the Board of Directors then in effect and applicable conditions imposed by DWR.

The monthly total of the water used shall not differ from the approved schedule of such an amount which will result in additional charges to the District as provided in the Water Supply Contract with DWR, except that the District may approve a change in water delivery schedule which may be conditioned upon payment of any added cost.

Rule 9. DAILY WATER ORDERS

All requests for water delivery shall be subject to the approval of the Manager of the District in accordance with applicable conditions imposed by DWR. Daily water orders must be made to the District no later than 8:30 a.m. for the next day's delivery (i.e. 24 hour notice for daily water deliveries), and weekly water schedules must be made to the District by 8:30 a.m. on the Wednesday of each week for the following week's (Thursday through Wednesday) deliveries. Monthly water schedules must be provided to the District as periodically requested. Water may be delivered on shorter notice in emergencies.

If scheduled in accordance with the previous paragraph, turn-on and/or turn-off orders may be scheduled at anytime. Unless other turn-on and/or turn-off orders have been scheduled, water must be used continuously and at a constant rate for each twenty-four hours beginning and ending at 9:00 a.m., except in the case of an emergency or where approved by the Manager.

All shut-off orders must be made to the District no later than twenty-four (24) hours before shut-off is desired. Shorter notice of shut-off is acceptable in emergencies. In the event of an emergency shut off, the District must be notified as soon as possible thereafter.

Except in the case of an emergency, as determined by the Board of Directors, water users who turn off water without notice or before shut-off time will be charged for the use of the amount of water requested or applied for and for all costs incurred by the District as the result of the shut-off of water by the water user, unless, another water user on the same distribution system has agreed to accept the additional water made available from the unscheduled shut-off.

Rule 10. WATER CHARGES

The District may from time to time establish and levy a standby charge to landowners and other water users in the Water Service Area and for providing for the delivery of that available water. The standby charge, per acre of land in the Water Service Area, may be in an amount up to that needed to pay for District administration and distribution system maintenance, and

any other costs which the Board of Directors may deem necessary for the proper operation of the District.

In the event the Board of Directors determines that an amount should be included in the standby charge to pay costs which are only to benefit a specific area of the District, the District shall be subdivided into distribution system sub-areas so that the standby charges more accurately reflect the costs to the District of each sub-area, and the standby charges for each sub-area may differ accordingly. The standby charges for each sub-area and the payment date and deposits (if any) with respect to standby charges shall be established by the Board of Directors.

The District may from time to time establish and levy an improvement district charge to landowners in areas served by District funded distribution systems. The improvement district charge, per acre of land in the improvement district area, may be in an amount up to that needed to pay for the annual debt service associated with the construction cost of capital facilities. The improvement district charges and the payment date and deposits (if any) with respect to improvement district charges shall be established by the Board of Directors.

The District may from time to time establish and levy a water toll charge to landowners and other water users for all types and classifications of water made available to water users, including without limitation, Table "A" Contract Water. Water toll charges levied per acre-foot of water scheduled for delivery, by the District shall be sufficient to pay the SWP Variable OMP&R and Off-Aqueduct charges to the District and the District's cost of delivery to a water user of the water subject to a water toll charge. The amount of water toll charges for any water supply made available to water users by the District, and the payment date and deposits (if any) with respect to water toll charges, shall be established by the Board of Directors.

The District may annually establish and levy benefit assessments on a per acre basis to all lands in the District. The benefit assessments shall be in an amount up to that needed to pay SWP Fixed Costs and a minimal amount of District administrative costs. The benefit assessment and the payment date(s) shall be established by the Board of Directors.

Rule 11. DELINQUENT CHARGES

In the event any assessments, standby charges, improvement district charges, water toll charges, or other charges for water or services levied by the District become delinquent, the Board of Directors may authorize the officers and employees of the District to take any or all actions permitted by law in order to secure and/or collect such delinquencies. The Board of Directors may also add to the amount of any such delinquency up to the maximum penalty permitted by law, and may charge up to the maximum interest rate permitted by law on any such delinquencies. The Board of Directors may refuse water service to any lands on which assessments or other charges are delinquent and/or unpaid. In the event the Board of Directors elects to commence action in a court of competent jurisdiction in order to collect such

delinquent assessments or charges, all costs and attorneys' fees incurred by the District in such action shall be added to the delinquent assessments or charges and shall be recovered by the District in any such action.

Rule 12. CREDITS AND REFUNDS

The Board of Directors, giving due regard to the District's reserves and financial condition, may from time to time approve refunds and credits to landowners and/or water users.

In any year in which a landowner or other water user has some or all of their allocation of Table "A" Contract Water used by other landowners or water users in accordance with these Rules and Regulations, a credit or refund shall be given to such landowner or water user to the extent their allocation of Table "A" Contract Water is actually so used by other landowners or water users. The amount of any such credit or refund shall be determined by the Board of Directors in any such year.

In any instance in which a penalty and/or interest has been imposed or charged against a landowner or other water user and in which a credit or refund is to be given, the penalty shall be based on the original delinquent amount and interest shall be calculated by accumulating interest on the outstanding amount (original amount up until any credit is issued, then on the adjusted charge) at rates as determined by the Board of Directors.

Rule 13. COST REIMBURSEMENT FOR AUTHORIZED IMPROVEMENTS TO DISTRICT FACILITIES

The District encourages landowner improvements made to the District's distribution system, and will allow for reimbursement to landowners constructing and dedicating such improvements to the District as described in the "**Agreement Regarding Improvements**" adopted by the Board of Directors on April 12, 1995, or as subsequently amended or restated.

Rule 14. NON-LIABILITY OF DISTRICT

The District will not be liable for damages of any kind or nature resulting directly or indirectly from any private ditch or pipeline or the water flowing therein or by reason of lack of capacity therein, or of negligent, wasteful, or other use of handling water by the users thereof, and the District's responsibility shall cease absolutely when the water is delivered to the water user. The District will not be liable for shortage of water, either temporary or permanent, or for failure to make water available to any delivery turnout. The District is subject to the terms and conditions of its Water Supply Contract with DWR and all laws, policies, and regulations affecting deliveries to the SWP and the District.

The District assumes no responsibility with respect to the quality of project water. All water users are advised that project water, as delivered by the District, is unfit for human consumption. All complaints concerning the quality of water should be referred to the Manager.

Rule 15. COMPLIANCE WITH RULES

Refusal to comply with each and all of these Rules and Regulations, or any violation of any of the foregoing Rules and Regulations, or any interference with the proper discharge of duties of any person employed by the District, shall be considered sufficient cause for termination of water service; water service will not again be furnished until, in the opinion of the Board of Directors, full compliance has been made with all requirements herein set forth. In no event shall any liability accrue against the District or any of its officers, agents or employees, for damage, direct or indirect, arising from such temporary discontinuance or reduction of water deliveries.

Exhibit 7. Policy for Temporary Transfer of Water.

POLICY FOR THE TEMPORARY TRANSFER OF WATER
TO OR FROM THE DUDLEY RIDGE WATER DISTRICT
(adopted by the Board of Directors on December 8, 2010)

This policy modifies and supersedes the prior water transfer policy (adopted December 13, 2000). This policy has been developed by the District to promote good water management of the District's State Water Project allocations and provide flexibility to the District's landowners.

For purposes of this policy, temporary transfers are defined as water transfers, banking, or exchanges from the District to areas outside the District that are requested annually or for a short-term period that do not create a long-term (greater than ten years) or permanent obligation or commitment for the District to continue such transfers.

Therefore, the following conditions state the District's policy for temporary water transfers.

1. Requests to transfer of water out of the District shall be allowed for the following:
   a. District-approved water banking or exchange programs;
   b. Transfers to the same landowner's or water user's lands outside the District where substantially the same landowner or water user business affiliation and use exists as exists within the District; and/or
   c. Non District-approved banking or exchange programs where at least 50% of the water (after reasonable losses) is returned to the District within a ten year period, or other period as allowed by the California Department of Water Resources.

2. Temporary transfers proposed under Paragraph 1, may be administratively approved by the Manager-Engineer, provided that the transfer does not take specific action by the Board related to CEQA compliance.

3. For temporary transfers proposed under Paragraph 1b or 1c, all District charges must be paid prior to District authorization to release the transferred.

4. Requests to transfer water into the District may be administratively approved by the Manager-Engineer, provided that the transfer does not take specific action by the Board related to CEQA compliance.

5. Any State or third party charges or fees related to temporary transfers into the District or to outside of the District shall be payable by the transferor(s). District staff time to assist with the transfer shall not be charged to the transferor. An exception to this rule occurs in the case of programmatic transfers where the program was initially offered to all landowners or water users, but not all water users are participating (such as Kern Water Bank and Dry Year Water Program), in

which staff time shall be accounted for separately and charged only to program participants.

6. The Manager shall report any transfers administratively approved to the Board at the District Board meeting following the receipt of the request(s) for the transfer.

7. Temporary transfers not eligible for administrative approval by the Manager-Engineer in accordance with this policy, or other requests for temporary transfers not described in Paragraphs 1 or 4, shall be brought to the Board for consideration on a case-by-case basis.

Exhibit 8. Policy for Permanent Transfer of Water.

POLICY FOR THE PERMANENT TRANSFER OF SWP TABLE A WATER OUTSIDE OF DUDLEY RIDGE WATER DISTRICT

REVISED FOR CONSIDERATION 12-8-2010

(for new transfers requested after adoption of a revised policy)

Introduction

The following policy was adopted by the Dudley Ridge Water District Board of Directors on April 8, 2009 and revised on December 8, 2010 and effective January 1, 2011. It is the intent of this policy to facilitate the voluntary permanent[1] transfers of State Water Project ("SWP") Table A contract amounts ("Table A water") by District landowners while protecting non-transferring landowners and water users. Accordingly, it is the express intent of the Board in adopting this policy to allow proposed permanent transfers to the maximum extent permitted by law, provided that such transfers do not create unmitigated material adverse impacts on other District landowners.[2]

Policy

1. This policy shall apply whether the permanent transfer of Table A water is specifically for the benefit of a District landowner's lands in another district or to a third party, either of which is referred to as a "third party" herein.[3]

2. Proposals to transfer Table A water will be brought before the Board whether the District receives unsolicited offers or proposed transfers are brought to the District by individual landowners.

   a. Third party Table A inquiries received by District: Upon adoption of this policy, the District will mail this policy to all landowners with a District Table A water allocation and request interested landowners to notify the District in writing if they

[1] "Permanent" transfers are defined as transfers of a portion of the District's Table A contract associated with a transferring landowner's land within the District to a non-District water purveyor as allowed by Articles 41 & 53 of the District's Water Supply Contract with the Department of Water Resources ("DWR") for State Water Project water.

[2] Such impacts include, without limitation, increased cost of water, decreased water supplies, or adverse impacts to land values caused by transfers governed by this Policy.

[3] This transfer policy contemplates that DWR will require that Table A water transferred outside of the District must be to another water entity, even if for the benefit of an individual within the water entity's service area.

are interested in selling Table A water in accordance with this policy; the District shall maintain a current list of interested landowners and their contact information. Subsequently, if the District receives third party inquiries to purchase Table A water, the District shall simultaneously notify all listed landowners with the name and contact information of the inquiring third party; the District Board will be copied. The District will not be directly involved in negotiation of the basic terms of the transfer proposal developed between landowners and prospective third party buyers of Table A water.

b. Table A sales offers from landowners: Landowners interested in permanent Table A water transfers shall provide the District a written proposal for transfer, signed by the landowner and prospective third party transferee.

c. Board review. With the advice of District staff and legal counsel, the Board shall review each transfer proposal and determine if it is consistent with this policy. If deemed by the Board to be consistent with this policy, the Board will direct staff to proceed with the following process: (i) provide current District landowners and other SWP contractors located primarily within Kings County[4] a 30-day period to review and execute a first right-of-refusal to accept all or a portion of the Table A amount proposed to be transferred on the same terms and conditions as being proposed in the third party transfer[5], (ii) initiate the applicable environmental review process, (iii) initiate requests for regulatory reviews and approvals, and (iv) subject to the completion of i, ii, and iii, the Board will then promptly consider approval of the proposed for transfer. The Board's approval shall not be unreasonably withheld if the proposed transfer conforms with this policy and has obtained all applicable environmental and regulatory reviews and/or approvals, unless the Board determines that the proposed transfer would result in an unmitigated material adverse impact to the District or to District landowners. The Board may condition approval of any transfer to mitigate any adverse impacts it identifies to the District or District landowners.

[4] Kings County, Tulare Lake Basin Water Storage District, and Empire West Side Irrigation District.

[5] If the proposed transfer includes non-monetary consideration (that is, consideration other than cash or indebtedness, or a common landowner transfer to its lands in another district), it may not be possible for District landowner(s) and/or a local SWP contractor(s) to exercise their first rights-of-refusal. Substitution of cash in an amount equal to the fair market value of the Table A water to be transferred or the non-cash consideration being offered will not be permitted. The first right-of-refusal may only be exercised if the landowner(s) and/or a local SWP contractor(s) seeking to exercise this right can provide the same consideration to the selling landowner(s) as is proposed by the intended transferee. In the event both a District landowner(s) and a SWP contractor(s) in Kings County exercise a first right-of-refusal for more than the Table A amount available, first priority will be given to the District landowner(s).

3. Financial requirements for a permanent transfer shall include the following:

    a. Prior to the transfer, the transferring landowner shall pay the District a lump sum representing the present worth[6] of the following:
        i. Any outstanding District bonds or loans and associated administrative costs (Improvement District Charge) associated with the District land that will be stripped of Table A water as a result of the transfer.
        ii. Estimated District administration costs for the eight-year period following the effective date of the transfer (Standby Charge less line items for Special Studies and Litigation) associated with the land that will be stripped of Table A water as a result of the transfer.

    b. The money collected by the District shall be placed in an interest bearing restricted account; annual withdrawals will be made to offset the costs to remaining landowners and water users. No other compensation to other District landowners shall be required of the transferring landowner.

4. Except as expressly provided below, a transferring landowner's capacity in the San Gabriel Valley MWD exchange program, the Cawelo Water District conjunctive use program, and other District-wide storage or exchange programs[7] will be reduced in proportion to the reduction in Table A water.[8]

5. If the transferring landowner is a District participant in the Kern Water Bank, the transferring landowner will also be required to relinquish its Kern Water Bank rights and obligations once the landowner's acreage in the District's Standby Charge area is reduced to less than the acreage originally[9] removed from the Standby Charge area or the landowner's Table A amount is reduced to less than the Table A amount

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[6] Present worth shall be calculated at an interest rate of 5%; future costs shall be projected based on information available from DWR and a forecasted rate of inflation not less than 5%.

[7] The Kern Water Bank is not considered a District-wide program for purposes of this policy.

[8] Per District policy (adopted 9-10-03), capacity in these programs is allocated based on the percentage of a landowner's Table A water. Note that the total District capacity would not be reduced as a result of a Table A water transfer, but the percentage of each water users' capacity in these programs would be adjusted.

[9] "Original" or 'originally" is defined as the landowner's Table A water and/or percentage of Kern Water Bank participation as associated with the landowner's remaining interest in the Kern Water Bank.

originally relinquished by that landowner or its predecessor to participate in the Kern Water Bank. [10]

a. The Kern Water Bank rights and obligations may be relinquished either by:
   i. Sales to another District landowner(s) or
   ii. Sales to the District.

b. In the event the transferring landowner has stored water remaining in the Kern Water Bank, the inventory may be relinquished either by:
   i. Sales to another District landowner(s) or
   ii. Sales to the District.

6. The transferring landowner shall enter into a reimbursement agreement with the District to pay the District for all associated costs in facilitating the permanent transfer of Table A water, including without limitation, conducting special meetings, administration, legal, CEQA, outside counsel or consultants, and/or litigation.

7. If Table A water is transferred out of the District, the water allocation shall be fully removed from individual parcels to the extent possible. The transferring landowner(s) shall designate which parcels from which the water is to be transferred. These lands will not receive a Table A water allocation; a notice satisfactory to the Board will be recorded on the property to this effect, as a condition to final Board approval of the transfer.

8. Final Board approval of any transfer under this policy will be further conditioned on the execution and (if appropriate) recordation of an agreement satisfactory to the Board memorializing the terms and conditions of this policy and such other terms as the Board determines to be necessary or appropriate in connection with the transfer. However, such agreement shall include, at a minimum, a binding commitment by the transferring landowner(s) and the transferee to jointly and severally indemnify, defend and hold the District and its directors, officers, landowners, agents and affiliates harmless from and against any and all liabilities, claims, demands, losses, costs, expenses (including reasonable attorneys' fees), damages or recoveries of

[10] As of the date of this policy, the participants in the Kern Water Bank are Paramount Farming Company ("PFC"), Irvine Ranch Water District ("IRWD"), Don Jackson, Hillside Orchards ("Hillside") and Sandridge Partners ("Sandridge"). The acreage originally removed by each participant or its predecessor from the District's Standby Charge area to participate in the Kern Water Bank was 2,201.36 acres (1,984.75 for PFC, 444.85 for IRWD, 57.46 for Don Jackson, 7.15 for Sandridge, and 7.15 for Hillside). The Table A water originally relinquished by each participant or its predecessor to participate in the Kern Water Bank was 4,330 acre-feet (3,904 for PFC, 285 for IRWD, 113 for Don Jackson, 14 for Sandridge, and 14 for Hillside).

any kind arising out of or in any way relating to the transfer or the actions or inactions of the District taken in connection therewith.

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